



ARE HEALTH CLAIMS UNDERSTOOD?

door
Sheila Francé
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Afstudeeropdracht Faculteit Natuurwetenschappen,
Open Universiteit Nederland

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ACRONYMS

ACCLAIM	Consumer acceptance and trust: Recommendations for using health-related claims in marketing
AFIC	Asian Food Information Centre
CCFN	Canadian Council of Food and Nutrition
DSHEA	Dietary Supplement Health and Education Act
EFSA	European Food Safety Authority
EUFIC	European Food Information Council
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
FOSHU	Foods for Specified Health Use
FSA	Food Standards Agency
FSANZ	Food Standards Australia New Zealand
FTC	Federal Trade Commission
GDA	Guideline Daily Amounts
GRAS	Generally Recognized as Safe
IFIC	International Food Information Council
ILSI	International Life Science Institute
NICE	Nordic Innovation Centre
NLEA	Nutrition Labeling and Education Act
PASSCLAIM	Process for the Assessment of Scientific Support for Claims on Foods
SSA	Significant Scientific Agreement
SSAS	Significant Scientific Agreement Standard
WHO	World Health Organization

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ABSTRACT

Abstract—Nutrition and Health Claims on food labels can help consumers improve their health and reduce risk of disease by making informed dietary decisions. To fully benefit from these claims, consumers need to understand the beneficial effects as expressed in the claim and be aware of the amount of scientific evidence that supports it.

Aim: This paper reviews recent scientific articles evaluating consumer understanding of health claims such as applicable in Europe and the United states.

Questions: Can consumers in the United States differentiate between health claims that are scientifically substantiated and claims for which the evidence is probable, possible or insufficient such as defined by the Food and Drug Administration (FDA)? Does a visual aid help to make the distinction between the levels of scientific support for the claim?

Can consumers differentiate between nutrition claims and health claims such as defined by European regulations? Do consumers understand the nutrition claim? Can consumers differentiate between function claims and reduction of disease risk claims?

Results: Consumers cannot distinguish between health claims that are scientific substantiated and claims for which the evidence is probable, possible or insufficient when reading a text only claim. However, when a visual aid (FDA report card graphic) was used, consumers were able to make a correct distinction between the four levels of claims.

Health Claims provide more insight into a relationship between the product and a health condition than a nutrition claim. Consumers have difficulty with some of the vocabulary used in nutrition claims such as ‘trans fats’ and do not always understand how much of the nutrient or substance the product contains when seeing a nutrition claim such as ‘high’ or ‘a good source of’. Consumers do make a distinction between function claims and reduction of disease risk claims, but not based on understanding the underlying scientific basis for the grouping such as used in the European regulation.

Conclusion: Consumers do not always understand health and nutrition claims as they are intended or the evidence supporting them.

SAMENVATTING (SUMMARY IN DUTCH)

Gezondheidsbewuste consumenten eten niet alleen om zich te voeden, maar ook ter bevordering van hun gezondheid. Er is rondom deze trend een hele industrie ontstaan die voedsel produceert met toegevoegde waarde, zogenaamde functionele voeding. Functionele voeding is bijvoorbeeld brood met extra vezels, of yoghurt met probiotica.

Om de consument bewust te maken van de gezonde eigenschappen van het product, moet daarover iets op de verpakking staan. Zo'n bericht wordt wel een gezondheidsclaim genoemd. Zo'n claim geeft de fabrikant een streepje voor op de concurrent. Deze claim moet echter wel voldoen aan bepaalde wettelijke eisen; zo moet het geclaimde gezondheidsvoordeel bewezen zijn en dat bewijs moet volgens wetenschappelijke criteria verkregen zijn. Zo kunnen consumenten de gezonde producten kiezen op basis van eerlijke reclameboodschappen. De wet verbiedt oneigenlijke claims. Het gebruik van voedings- en gezondheidsclaims is alleen toegestaan indien de gemiddelde consument de heilzame effecten die in de claim worden geuit kan begrijpen.

In hoeverre begrijpen consumenten gezondheidsclaims en kunnen zij een onderscheid maken tussen verschillende types claims? Dat is de centrale vraag die hier wordt onderzocht. Dit verslag geeft een overzicht van de literatuur over dit onderwerp en richt zich met name op de situatie in Europa en de Verenigde Staten.

Er bestaan in Europa verschillende soorten claims, zoals voedingsclaims die aangeven of het product veel of weinig van een ingrediënt (zoals bijvoorbeeld vet of suiker) bevat en gezondheidsclaims die beweren dat het product de gezondheid bevordert. Voedingsclaims zeggen niets over de invloed van het product op de gezondheid, alleen wat het bevat, terwijl gezondheidsclaims dat wel doen. Gezondheidsclaims zijn onderverdeeld in functieclaims (het product draagt bij aan de groei, de ontwikkeling of normale fysiologische functies van het lichaam) en claims inzake ziekte risico reductie (het product draagt bij tot het verminderen van het risico op een ziekte). Alle claims in Europa moeten wetenschappelijk onderbouwd zijn.

In de Verenigde Staten wordt een onderscheid gemaakt tussen gezondheidsclaims die overtuigend bewezen zijn en claims waarvan het bewijs nog onvoldoende is (ontoereikend, mogelijk of waarschijnlijk). De gezondheidsclaims waarvan het bewijs overtuigend is mogen in de Verenigde Staten zonder beperking op het etiket worden gebruikt ('calcium is goed voor de botten').

Claims waarvan het bewijs nog niet overtuigend is, moeten dat expliciet vermelden door middel van een 'disclaimer', dat is een declaratie die de beperkte mate van het bewijs moet verduidelijken aan de consument. Dat heeft het nadeel dat de consument erg lange zinnen te zien krijgt, zoals de volgende claim met bijbehorende disclaimer (dat is het onderstreepte gedeelte van de zin):

'wetenschappelijk bewijs suggereert, maar bewijst niet dat het eten van 1,5 ons per dag van de meeste noten zoals (de ...noot) als onderdeel van een dieet dat laag is in verzadigd vet en cholesterol, mogelijkerwijs uw risico op hartkwalen zou kunnen beperken.'

Een hulpmiddeltje voor de consument is een visueel kaartje met de letter 'A' t/m 'D'. 'A' staat dan voor de claim waarvan het bewijs overtuigend is en D die waarvan het bewijs zeer beperkt is.

Begrijpen consumenten het verschil tussen gezondheidsclaims die overtuigend bewezen zijn en die waarvan het bewijs nog onvoldoende is? Consumenten kunnen geen onderscheid maken tussen overtuigend bewezen gezondheidsclaims en claims waarvan het bewijs nog onvoldoende is. Consumenten zijn niet in staat om onderscheid te maken tussen de vier niveaus van gezondheidsclaims als ze de disclaimers lezen die de sterkte van het wetenschappelijk bewijs voor de claim moeten aangeven.

Wat is de invloed van een visuele hulpmiddel op het begrijpen van de vier niveaus van gezondheidsclaims? Consumenten begrijpen niet het verschil tussen het niveau van wetenschappelijk bewijs voor een gezondheidsclaim wanneer die wordt uitgedrukt in woorden, maar een visueel hulpmiddeltje kan helpen bij de juiste mate van wetenschappelijke onderbouwing voor de claim. Alleen wanneer een visuele hulp (FDA rapport kaart) gebruikt werd konden consumenten een correct onderscheid maken tussen de vier niveaus van claims. De combinatie van een claim met een vinkje naast een van de letters 'A' t/m 'D', hielp de consumenten direct te zien welk van de claims de hoogste rang en meest sterke wetenschappelijke onderbouwing had.

Kunnen consumenten een verschil zien tussen voedingsclaims en gezondheidsclaims? Gezondheidsclaims geven meer inzicht in de relatie tussen het product en de gezondheid. Een gezondheidsclaim wordt beter begrepen dan een voedingsclaim, vooral indien het gezondheidsvoordeel hart- en vaatziekten betreft. Wanneer de claim onderwerpen betreft als gewichtsverlies en concentratieverbetering is de voedingsclaim makkelijker te begrijpen. In één onderzoek

konden consumenten geen onderscheid maken tussen voedings- en gezondheidsclaims. In het algemeen gesproken lijkt het erop, dat de consument het verschil kan zien tussen voedingsclaims en gezondheidsclaims, maar meer onderzoek, vooral uit Europa, is nodig.

Begrijpen consumenten voedingsclaims? Consumenten kennen niet de waarden die horen bij termen zoals 'rijk', 'een goede bron van...' of 'light' die veelvuldig gebruikt worden in voedingsclaims en begrijpen de termen daardoor niet. Bijvoorbeeld betekent 'suikervrij' dat er ook geen natuurlijke suikers in het product zitten of dat er geen suiker is toegevoegd? Consumenten vinden veel termen die in voedingsclaims worden gebruikt (zoals trans vet) moeilijk. Wanneer de terminologie in de voedingsclaims en de risico's en voordelen van de stoffen in de producten niet goed begrepen worden, dan worden de claims ook niet goed begrepen.

Er is onvoldoende onderzoek gedaan, met name in Europa, om de vraag te beantwoorden of consumenten in staat zijn functie- en ziekte risico reductie claims te kunnen onderscheiden. Consumenten maken een onderscheid tussen de soorten beweringen, maar niet om de juiste redenen. Functieclaims en ziekte risico reductie claims hebben een positieve invloed op het beeld dat de consument heeft over het 'gezond' zijn van voeding. In de Verenigde Staten zien consumenten het verschil niet in wetenschappelijke ondersteuning tussen de bewezen gezondheidsclaims (niveau 'A') en de structure-functieclaims die niet worden getoetst op wetenschappelijk bewijs. Professionals in de voeding zijn in staat om te herkennen welke claims erkend zijn of niet toegelaten, maar hebben moeite structure-functie claims te herkennen.

Begrijpen consumenten de claim als deze wordt gepresenteerd door middel van een symbool op de voorkant van het pak? Een symbool op de voorkant van de verpakking is een nuttig hulpmiddel voor consumenten om een snelle keuze te maken tussen soortgelijke producten tijdens het hectische winkelen. Voor consumenten die meer informatie willen, kan uitgebreidere informatie op de achterkant van de verpakking worden gezet. Sommige symbolen worden echter beter begrepen dan andere; bijvoorbeeld mensen met weinig kennis van gezondheid en voeding vonden de 'Wheel of Health' moeilijker te begrijpen dan de 'Smiley's'. Een symbool dat een positieve beoordeling krijgt is het 'Pick the Tick' symbool van de Heart Foundation uit Australië. Deze 'Pick the Tick' heeft bewezen effecten op beperking van het gebruik van zout in producten.

Interpreteert de consument de claim zoals die is bedoeld of trekt hij conclusies op basis van vooringenomenheid? Consumenten interpreteren claims niet altijd zoals ze bedoeld worden. De manier waarop de claim is verwoord en de niveaus met betrekking tot de mate van bewijs voor de claim, hebben onbedoelde neveneffecten op de perceptie van de consument over de algemene veiligheid van het product, kwaliteit en gezondheid. Bevooroordeelde conclusies zoals 'positieve bias', 'boemerang-effect', 'interactie effect' en 'halo effect' zijn aangetoond.

Wordt de perceptie, interpretatie en het begrijpen van claims beïnvloed door andere factoren dan kennis, zoals demografische variabelen, gezondheidstoestand of culturele verschillen? De wet vereist dat de claims begrijpelijk zijn voor de gemiddelde consument, maar de gemiddelde consument bestaat niet. Veel variabelen beïnvloeden consument inzicht in gezondheidsclaims, zoals sociaaldemografische factoren, de kennis over de claim en de in de claim genoemde voedingsstof, vertrouwdheid met het product en de claim en de gebruikte terminologie in de claim. Consumenten nemen de gezondheidsclaim niet onafhankelijk waar van het product waarop de claim staat vermeld of van het gezondheidsvoordeel dat in de claim genoemd wordt. Het begrijpen van een claim of de stof die wordt genoemd in een claim kan verschillen naar gelang het land van herkomst. De perceptie van de gezondheid en de voeding kan worden beïnvloed door persoonlijke interesses of culturele factoren (smaak, religie, eten biologisch voedsel).

Conclusie

De conclusie van deze literatuurstudie is dat consumenten het onderscheid in de mate van wetenschappelijk bewijs voor een claim niet begrijpen als er alleen tekst 'disclaimers' worden gebruikt, maar met de hulp van een visueel hulpmiddel wel onderscheid kunnen maken tussen de vier niveaus van claims. Het is niet duidelijk geworden of de consument het verschil begrijpt tussen voedingsclaims, gezondheidsclaims en ziekte risicobeperking claims. Wel is duidelijk dat voedingsclaims eenvoudige taal moeten gebruiken en duidelijker over de gebruikte waarden die staan voor de termen zoals 'light' moeten zijn. Een korte claim of logo op de voorkant van de verpakking, met meer informatie op de achterkant van de verpakking, kan helpen de consument snel een keuze te maken in de supermarkt en later thuis te lezen wat er precies bedoeld wordt in de claim.

EXECUTIVE SUMMARY

Health-conscious consumers increasingly use food not just for nourishment, but also for the improvement of their health. The industry has used this trend to produce food that is healthy as a result of naturally occurring ingredients such as soluble fiber in oat bran, or added ingredients that provides extra health benefits beyond basic nutrition (also called functional food). In order to make the consumer aware of these healthy properties, the company has to put some sort of message on the label of the product: a health claim.

Claims about health benefits must be based on sound scientific criteria. Consumers should be able to choose on the basis of clear labeling. Regulations are in place to protect the consumer from false or overrated claims. The health claim has to be backed by scientific evidence or should make clear that there is limited scientific evidence. The use of nutrition and health claims shall only be permitted if the average consumer can be expected to understand the beneficial effects as expressed in the claim.

Do consumers understand the health claims and can they make a distinction between different types of claims? That is the central question that is investigated here. This report reviews existing literature on consumer understanding of health claims and focuses mainly on the situation in Europe and the United States.

There are different types of claims in Europe, such as nutrition claims, which indicate whether the product contains much or little of an ingredient (such as fat or sugar), and health claims which claim that the product promotes health. Health claims are subdivided in function claims (sometimes called generic health claims. The product or one of his constituents contributes to the growth, development or normal physiological functions of the body) and reduction of disease risk claims (The product helps to reduce the risk of a disease). All the claims in the European Union have to be scientifically substantiated.

The United States makes a distinction between health claims that are based on convincing evidence and claims for which the evidence is insufficient, possible or probable.

Health claims for which the evidence is convincing can be used on the label without restrictions ('calcium is good for the bones'). However, claims for which the evidence is still inconclusive, have to specify this by means of a disclaimer, a statement that clarifies the limited degree of proof to the consumer. This has the disadvantage that consumers see very long sentences such as

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the following claim with disclaimer (the underlined part of the sentence): "Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts as [the nut ...] as part of a diet low in saturated fat and cholesterol, **may** reduce your risk of heart disease'.

An aid for the consumer is a visual graphic ('report card') with the letter 'A' to 'D'. 'A' stands for the claim with convincing scientific evidence and D for which the evidence is very limited.

Do consumers see the difference between scientifically substantiated health claims and those of which evidence is probable, possible or insufficient? Consumers cannot distinguish between health claims that are scientifically substantiated and claims for which the evidence is probable, possible or insufficient. Consumers are not able to distinguish between the four levels of health claims when reading the disclaimers that indicate the strength of scientific evidence for the claim.

What influence does the visual form have on understanding the difference between the four levels of health claims? Consumers do not understand the difference between the level of scientific evidence for a health claim when expressed in words, but a visual aid does help to convey the right amount of scientific support for the claim. Only when a visual aid (FDA report card graphic) was used, consumers were able to make a correct distinction between the four levels of claims. The combination of a claim with a check mark next to one of the letters 'A' to 'D', helped consumers to see which of the claims had the highest ranking and the strongest scientific support.

Can consumers differentiate between nutrition claims and health claims? Health Claims provide more insight into a relationship between the product and a health condition. A health claim is better understood than a nutrition claim in particular in conjunction with benefits such as cardiovascular disease. When the benefits concern weight loss or improvement of concentration the nutrition content claim is easier to understand. In one study consumers could not distinguish between nutrition and health claims. In general, it seems that consumers can differentiate between nutrition claims and health claims, but more research, especially from Europe, is required.

Do consumers understand the nutrient content claim? Consumers do not understand the cut-off points frequently used in the nutrient content claims like 'high', 'a good source of...' or 'light'.

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For example, does 'sugar free' mean that the product contains no natural sugar or that no sugar is added? Consumer found many terms used in nutrition claims (such as trans fat) difficult. When the terms in nutrition claims and the risks or benefits of the substances in the products are not well understood, the claims are also not well understood.

Not enough research is done, particularly in Europe, to answer the question whether consumers are able to differentiate between function- and reduction of disease claims. Consumers do make a distinction between the types of claim, but not on the right premises. Function claims and reduction of disease risk claims have a positive influence on consumers' perception of the healthiness of foods. In the United States consumers cannot see the difference in scientific support between scientifically substantiated health claims (level 'A') and the structure function claims that are not evaluated on scientific evidence. Although food professionals can recognize which claims are approved or unapproved, they have difficulty recognizing structure-function claims.

Do consumers understand the health claim if it is presented with a front of the pack logo? A front of the pack logo is a useful tool for consumers to make a fast choice between similar products during hectic shopping. For consumers that like to be more informed, a more complete information can be placed on the back of the pack label. Some symbols are better understood than others; for example, for people with little knowledge of health and nutrition the 'Wheel of Health' was harder to understand than the 'Smiley's'. A symbol with a positive evaluation is the 'Pick the Tick' symbol of the Heart Foundation of Australia. This 'Pick the Tick' has proven effects on reducing the use of salt in products.

Do consumers interpret claims as they are intended or do they make biased inferences? Consumers do not always interpret claims as they are intended. The way in which the claim is expressed and the ranking on level of evidence for the claim, has unintended side effects on consumer perceptions on the overall product safety, quality and healthiness. Biased inferences such as the 'positive bias', 'boomerang effect', 'interactive effect' and the 'halo effect' have been demonstrated.

Is the perception, interpretation and understanding of health and nutrition claims influenced by other factors than knowledge, such as demographics variables, health status, cultural differences, trust or other variables? The law requires that health claims are understandable for the average

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consumer, but the average consumer does not exist. Many variables influence consumer understanding of health claims, such as socio-demographic factors, knowledge about the claim and the substance mentioned in the claim, familiarity with the product and the claim and the terminology used in the claim. Consumers do not perceive the health claim independently from the carrier or the benefit stated in the claim. Understanding a claim or the substance mentioned in a claim can be different depending on country of origin. The perception of health and nutrition can be influenced by personal interest or cultural factors (taste, religion, eating organic food).

Conclusion

The conclusion of this review is that consumers do not understand the amount of scientific evidence for a claim if text only disclaimers are used, but with the help of a report card graphic they can differentiate between the four levels of claims. It is not clear whether the consumer understands the difference between nutrition claims, health claims and reduction of disease risk claims. It is apparent however that nutrition claims should use simple expressions and should be clear about how much the product contains of a nutrient or substance. Consumers draw their own conclusions about the different claims based on their own reasoning.. A short claim or logo on the front of the pack, with more information on the back of the package, can help consumers quickly make a choice in the supermarket and to read later at home what is exactly meant in the claim.

Chapter 1 Introduction

1.1 Introduction

Use of health claims

Health-conscious consumers are increasingly using food not just for nourishment, but also to improve their health. The industry has used this trend to produce foods that are healthy as a result of naturally occurring ingredients such as soluble fiber in oat bran or added ingredients that provide extra health benefits beyond basic nutrition (so called functional food). In order to make the consumer aware of these healthy properties, the company has to put a message on the label of the product. Such a message, a health claim, will give the company a marketing advantage over companies not making claims. Thus the claim has two objectives: increasing the marketing value of the product and helping consumers to choose a product that's beneficial for the health.

Substantiated claims

Putting a claim on the label can help differentiate from competitors, but claims about the nutritional and health benefits of a food will only be allowed if they are backed by scientific evidence or make clear that there is limited scientific evidence. To protect consumers from false or overrated claims there are laws to make sure that a claim made on a food label is clear, accurate and substantiated. Only products offering genuine health or nutritional benefits will be allowed to refer to these benefits on their labels. This will enable consumers to make informed and meaningful choices when it comes to food and drinks.

Change in law

The regulation of health claims on food labels is currently undergoing huge developments. Canada, Australia, the United States, Europe and even Asia are all working on refining and retuning the law.

Before 2006 each country in Europe had its own law for labeling food and health claims. In December 2006, a regulation on the use of nutrition and health claims for foods was adopted by the European Parliament and Council. This 'Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods' (in short referred to as Regulation 1924/2006) lays down harmonized rules for the use of

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health claims (such as “helps lower cholesterol”) or nutritional claims (such as “low fat”, “high fibre”) on foodstuffs (European Communities, n.d.).

Four levels of evidence

In the United States the Food and Drug Administration (FDA) makes a distinction between the amount of scientific evidence for the claims. Grades A-D are used to show the amount of Significant Scientific Agreement (SSA) that supports the claim. Grade A claims are Scientifically Substantiated Health Claims. The amount of SSA is high and the claim can be used on a label as such. For claims with level B (for which the SSA is probable), C (SSA is possible) and D (SSA is insufficient) the evidence provides a reasonable expectation that there is a substance/disease relationship. The claim should be clarified with a disclaimer, so that the claim is appropriately characterized and supported by the evidence.

Health claims are very wordy and have difficult terms in them that make them very hard for consumers to understand. The FDA has tried to make this difference in level of evidence more understandable to consumers by developing a visual aid in the form of a graphic.

Distinction between types of claims

The EU-regulation and the FDA both make a distinction between “nutrient content claims” (for instance ‘high fiber’) and “health claims” (for instance ‘fiber may reduce the risk of heart disease’). The health claims in Europe are additionally subdivided in ‘function claims’ and ‘reduction of disease risk claims’. A ‘function claim’ is a claim about what a product does to improve physical or mental health. A ‘reduction of disease risk claim’ is a claim that states that eating the product (in the advised quantity and as part of a healthy diet) will reduce the risk of getting a particular disease.

In the United States a claim similar to the function claim exists: a structure-function claim. The structure function claim has not the same amount of scientific evidence as a health claim. Structure function claims are easier to understand than the wordy health claims and they do not emphasize an illness, but the healthiness of the product (e.g. “promotes healthy vision”, “enhances the immune system”).

1.2 Central question

Regulation 1924/2006 states that “The use of nutrition and health claims shall only be permitted if the average consumer can be expected to understand the beneficial effects as expressed in the claim” (European Parliament and Council, 2006). The central question that is investigated in this study is “Do consumers understand health claims on food?”

This central question is subdivided in several questions:

1. Do consumers see the difference between scientifically substantiated health claims and those of which evidence is probable, possible or insufficient?
2. What influence does the visual form have on understanding the difference between the four levels of health claims?
3. Can consumers differentiate between nutrition claims and health claims?
4. Do consumers understand the nutrient content claims?
5. Can consumers differentiate between function claims and reduction of disease risk claims?
6. Do consumers understand the health claim if it is presented with a front of the pack logo?
7. Do consumers interpret claims as they are intended or do they make biased inferences?
8. Is the perception, interpretation and understanding of health and nutrition claims influenced by other factors than knowledge, such as demographic variables, health status, cultural differences or other variables?

1.3 Relevance

Consumer understanding is one of the prerequisites in acceptance of claims in the EU legislation. Therefore in Europe many studies about consumer understanding are conducted currently, for instance as part of the ACCLAIM project in the Nordic states. ACCLAIM (stands for ‘Consumer acceptance and trust: Recommendations for using health-related claims in marketing’) is a research project that studies how consumers perceive health claims (ACCLAIM, nd). In the United States the FDA is concerned about consumer understanding of the level of scientific support for health claims. Several studies have been conducted on this topic. Because of the increase of obesity, consumer understanding of nutrition claims is also very important. With the increased demand for functional food, interest in the consumers perception of functional food and the health claims made on them is rising. Because the topic of health claims and functional food is popular at the moment, research is still taking place presently. Research from this year could be outdated next year because in the meantime the laws might have changed as well as the health claims that were permitted before are not anymore.

Chapter 2 Methods

Literature study

This literature study examines studies and articles about consumer understanding and interpretation of health claims. The reviewed literature covered academic journals, magazine and newspaper articles, abstracts of market reports and web page content. Only material in English and Dutch was reviewed.

Internet Sources

The main websites to find the titles and abstracts of articles in scientific magazines were Pubmed and Google (Scholar). Other websites that have been very useful were:

Databases of publications

- BioinfoBank (lib.bioinfo.pl)
- findarticles.com
- <http://www.emeraldinsight.com>
- www.blackwell-synergy.com (changed to: interscience.wiley.com)

University websites

- Wageningen (library.wur.nl)
- University of Wollongong (ro.uow.edu.au)

Journals

- Journal of Nutrition (jn.nutrition.org)
- American Journal of Clinical Nutrition (<http://www.ajcn.org>)
- European Journal of Public Health (eurpub.oxfordjournals.org)

Websites of government agencies

- Center for Food Safety and Applied Nutrition (<http://www.cfsan.fda.gov>)
- Food Standards Australia New Zealand (<http://www.foodstandards.gov.au>)
- Canadian Council of Food and Nutrition (<http://www.ccfm.ca>)
- Federal Trade Commission (<http://www.ftc.gov>)
- European Food Information Resource Network (<http://www.eurofir.net>)
- European Food Safety Authority (www.efsa.europa.eu)

Search terms

‘Search terms’ used in the web search were: “nutrition”, “nutritional”, “nutrient” and “label”, “labelling”, “labeling”, “health claim” and “food”, “nutrition claim”, “nutrient content claim”,

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“nutrient function claim”, “nutrition function claim”, “function claim”, “disease risk reduction claim”, “reduction of disease risk claim”, “structure-function claim”, “consumer understanding”, “functional food”, “functional foods”, “Regulation 1924/2006”, “article 13 claim” and “article 14 claim” and combinations of these terms.

In addition to the results that were found via the search on internet, references used in relevant articles were used.

Since the subject is rather broad, it was decided not to expand the study to include nutritional labeling (that is the information on nutritional values), therefore articles that just investigated that topic have been put aside. This report focuses mainly on the situation in Europe and the United States, but some research from Australia and Asia was useful and is therefore included.

The health claims on dietary supplements (such as vitamin supplements) and nutraceuticals (extracts of foods that claim to have a medicinal effect on human health) are not included in this study, only claims on (functional) food.

Material

Thirty seven articles published after the year 2000 were selected that gave, in some way, an answer to the question “can consumers understand health claims?” Articles that were not fully available via the internet (free of charge), were presented to me by the RIVM for which I am very grateful.

Four articles were more insightful than others. Those were the studies from Derby & Levy (2005), Kapsak et al. (2008), Hooker & Teratanavat (2008) and Teratanavat et al. (2004), which gave quantifiable data about consumer understanding of health claims and the science that supports them.

The studies from the Food Standards Australia New Zealand (FSANZ) are performed in Australia and New Zealand with the claim types that are applicable there. The research was good and gave very interesting results about many of the questions asked in this report, therefore some results are included here (FSANZ 2003 a & b, 2005 a & b, 2006).

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Some articles gave less concrete information, but still gave answers to some of the questions such as Murphy (2005), Murphy et al. (2007), Van Kleef et al. (2005), Van Trijp and Van der Lans (2007), Food Standards Agency (2002), Svederberg (2002), Feunekes (2008), Gyselaers (2006), Camire & Dougherty (2005), Wansink & Chandon (2007), Bech-Larsen & Grunert (2003), Asian Food Information Centre (2007) and Lin (2007). Vandercammen only published his abstract (2005).

Some articles were of minor importance: Byrd-Bredbenner et al. (2000), Siegrist et al. (2008), Adams & Geuens (2005), Urala (2005), Singer et al. (2006), Lanumata et al. (2008), Chan et al. (2005), Young and Swinburn (2002), Canadian Council of Food and Nutrition (CCFN, 2006).

Five reviews were read. One was particularly helpful, that was the review of Leathwood et al. (2007). The other reviews are those from Williams (2006), Hasler (2008), Wansink & Cheney (2005) and Edcoms (2007).

ACCLAIM stands for 'Consumer acceptance and trust: Recommendations for using health-related claims in marketing' (ACCLAIM, nd). The research project studies how consumers perceive health claims. In 2007 they carried out a survey about health claims, funded by the Nordic Innovation Centre and in collaboration with Centre for research on customer relations in the food sector (MAPP) and the University of Aarhus. The results aren't published yet, but a video presentation (+ Power Point slides) about this study of Grunert (2007) was found on the internet as well as two PowerPoint presentations of the coordinator Lähtenmäki. Also a short article in a report for MAPP of Pedersen & Grunert (2008) was found.

Two television programs, 'Kassa' of the Vara (Vara, 2008) and 'Keuringsdienst van Waarde' of the RVU (RVU, 2008) addressed the front-of-the pack logo (a form of health claim) and are discussed as well.

Chapter 3 Structure of the Report

- In Chapter 4 an explanation of used terms such as ‘health claim’ and ‘Significant Scientific Agreement’ is given.
- In Chapter 5 the review starts with studies that give answer to the questions “Do consumers see the difference between Scientifically Substantiated Health Claims and those of which evidence is probable, possible or insufficient?” and “What influence does the visual form have on understanding the difference between the four levels of health claims?”
- In Chapter 6 the questions about consumer’s ability to differentiate between different types of claims is elaborated on.
- The topic of Chapter 7 is Front-of the pack logo’s.
- Chapter 8 answers the question: “Do consumers interpret claims as they are intended or do they make biased inferences?”
- In Chapter 9 other factors in consumer understanding of health and nutrition claims are discussed such as socio-demographic differences and terminology used in the claim.
- In Chapter 10 the conclusions, discussion and suggestions for more research are presented.
- References
- Appendix A: Examples of Authorized health claims (claims that have SSA)
- Appendix B: Comparison between the nutrition claims as defined by the European Regulation 1924/2006 and as defined by the FDA.
- Appendix C: Claims of other parts of the world (Japan, Australia and Canada) and in international trade (Codex Alimentarius), are described.
- Appendix D: Research Summary, a table with a summary of the studies used in this report.
- Index

Chapter 4 What kind of claims exist?

4.1 Introduction

This chapter starts with a clarification of the term ‘health claim’. Examples of claims are given as they are presently defined in the regulations of Europe (§ 4.3.1) and in the United States (§ 4.3.2). After the types of claims, the scientific evidence of health claims is discussed (§ 4.4).

Next follows an introduction to terms that are frequently used in literature about health claims such as ‘and ‘functional food’ (§ 4.5).

4.2 What is a claim?

Health claims are statements about the beneficial effect on the body of a food, or its ingredients. Claims can alert consumers to a product’s health potential by stating that certain foods (as part of an overall diet) may reduce the risk of a certain disease (Hurt and Crocco, 1986, as cited in Wansink and Cheney, 2005) Although a claim can encourage people to eat a healthy diet it is also a marketing tool for the producers to sell their product (Verhagen, 2004).The conflict of interest between providing information versus advertisement, could be confusing for consumers.

Claims are not allowed to misinform consumers, therefore there are rules for food labeling. But each country/region has its own rules and regulations and within these sets of regulations a variety of claim types are defined. In the last few years Canada, the United States of America, Europe, Japan, Australia and New Zealand have worked on improving existing national regulations on food labeling. One of the goals is harmonizing rules, the other goal is to make clear, accurate labels with substantiated claims. In the next section the different types of claims as defined in the European Regulations and the Regulations of the FDA in the United States are described.

4.3 Types of Claims

4.3.1 European Union

The area of health claims has been unregulated in Europe until recently. In December 2006 a new regulation was adopted ‘Regulation (EC) No 1924/2006 of the European Parliament and of the Council of 20 December 2006 on nutrition and health claims made on foods ’(in short

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Regulation 1924/2006). The Regulation 1924/2006 came into force on 19 January 2007, and applied from 1 July 2007. The objective of the Regulation 1924/2006 is to harmonize legislation in the European Union and facilitate free movement of goods. The Regulation 1924/2006 protects the consumer from misleading claims by requiring that all the claims have to be substantiated and that before they can be used on the market, the claim has to be authorized. Therefore all the claims that will be authorized in the near future are scientifically substantiated, there will be no 'qualified claims' in Europe.

The Regulation 1924/2006 includes 37 clauses, 29 Articles and an Annex for nutrition claims and conditions applying to them. In practice, three main types of health claim are included in the Regulation 1924/2006 : nutrition claims, article 13 claims and article 14 claims. Table 1 shows the claims of the EU Regulation in more detail. The examples in the table are merely intended as an illustration for the type of claim and are not necessarily claims that will eventually be permitted because the process of evaluating claims by the European Food Safety Authority (EFSA) is not completed yet. Table 1 shows that there are nutrition claims and health claims in the EU regulation. Nutrition claims are divided in comparative and content claims. Health claims are divided in article 13 and article 14 claims. The function claims are subject of article 13 and reduction of disease risk claims are subject of article 14. The wording of health claims is an essential issue in the Regulation 1924/2006 (Reuterswärd, 2007).

A list of authorized nutrition claims and the conditions for use is published in the Annex to Regulation 1924/2006. These conditions of use can be seen in 'Appendix B' where Nutrition claims, such as defined in Regulation 1924/2006 of the European Union are compared with nutrient content claims such as defined by the FDA in the United States.

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Claim	Definition / Description	Example
Nutrition claims	Nutrition claims refer to any statement, other than nutrition labeling declarations, which declares or implies that a food contains, or has a high or low amount, of one or more nutrients.	
Comparative claims	Compare the level of a nutrient in a food to that of another food	Reduced" (see Appendix B for explanation of the term 'Reduced') or "increased calcium"
Content claims	Describe the level of a nutrient contained in food	Source of omega-3 fatty acids" or "Folic acid source" (see Appendix B for explanation of the term 'Source')
Health Claims	Any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health	
Article 13 (Function claims)	The role of a nutrient / substance in growth, development and the functions of the body.	"This product contains calcium - calcium is relevant for the development of strong bone and teeth"
	Role of a nutrient / substance in psychological and behavioural functions e.g.	"Fish oil helps/contribute to maintain a healthy memory"
	Slimming and weight control or reduction of hunger, increase of satiety or the reduction of available energy from the diet	"Foods high in fibre help you to feel full for longer to help maintain your body weight"; "protein promotes satiety"
Article 13 (5)	Health claims based on <i>newly developed scientific evidence</i> and/or applications which include a request for the protection of proprietary data	<i>examples are not published because of confidentiality</i>
Article 14	Claims referring to children's development and health	"Essential fatty acids are needed for normal growth and development of children"
	Reduction of disease risk claims	"Plant sterols have been shown to lower/reduce blood cholesterol. Blood cholesterol lowering may reduce the risk of coronary heart disease"

Table 1 Overview of nutrition and health claims in Regulation 1924/2006

4.3.2 United States

Table 2 describes the regulation of health and nutrition claims as defined by the FDA in the United States. The FDA recognizes nutrient content claims, health claims and structure-function claims. Health claims are divided into ‘authorized (=unqualified) health claims’ and unqualified health claims. Regarding the level of scientific evidence that supports the claim, the unqualified health claims are graded as level ‘A’ health claims and qualified health claims are level ‘B’, ‘C’ and ‘D’ health claims. In § 4.4 The Scientific grading of health claims is elaborated on.

Claim	Description	Example
Nutrient Content Claims	Claims that characterize the level of a nutrient identified on the Nutrition Facts Panel in accordance with FDA regulations such as “high,” “low” or “free,” or compare the level of a nutrient using terms such as “more,” “reduced” or “light.”	"High in oat bran"; "Low fat sour cream" "low fat" (see Appendix B for details of FDA Nutrition Claims); "contains 100 calories"
Structure-Function Claims	A claim to describe "the effect of a food (nutrient) or a food substance (ingredient) on a (normal) structure or function of the body. The claim can also be used to describe general well-being from consumption of a nutrient. The manufacturer is responsible for ensuring the accuracy and truthfulness of structure-function claims. A label with a structure function claim must state in a "disclaimer" that FDA has not evaluated this claim. The disclaimer must also state that this product is not intended to "diagnose, treat, cure or prevent any disease," because only a drug can legally make such a claim (US FDA, 2002).	"Fiber maintains bowel regularity"; "Antioxidants maintain cell integrity"; "Bilberry anthocyanins promote healthy vision"; "Echinacea enhances the immune system"

(continuing on the next page)

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(...continued from the previous page)

Claim	Description	Example
Health claims	A "health claim" is an explicit or implied statement in food labeling about the relationship of a food substance to a disease or health-related condition.	
Authorized health claims / unqualified health claims	Claims based on a Significant Scientific Agreement Standard (SSAS), which determines that the nutrient/disease relationship is well established.	"Soluble fiber from foods such as oat bran, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [name of food] supplies __ grams of the 3 grams soluble fiber from oat bran necessary per day to have this effect." (See Appendix A for more examples of unqualified health claims.)
Health Claims authorized on an authoritative statement of a scientific body of the United States government or the National Academy of Sciences.		"Clinical and animal studies provide firm evidence that omega-6 polyunsaturated fatty acids when substituted for saturated fatty acids result in a lowering of serum total cholesterol and LDL cholesterol and usually also some lowering of HDL cholesterol levels.
Qualified Health Claims	Qualified health claims are those based on emerging evidence for the relationship between a food or supplement and a reduced risk of disease. Because the evidence is not well enough established to meet the SSAS, this type of claim must include qualifying language to indicate that the evidence supporting the claim is limited.	"Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts [, such as name of specific nut,] as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease. [See nutrition information for fat content.]"

Table 2 FDA regulation of health and nutrition claims

Source: (CFSAN, 2006)

The legislation in the United States differs from the EU Regulation 1924/2006 as it allows claims on the basis of less firm evidence, although this must be made clear by a disclaimer (legal statement) or other qualifying language to accurately communicate the level of scientific evidence supporting the claim. Unqualified claims can be used without any qualifications (no

disclaimer needed). The FDA provides standardized sentences (model language), which it considered appropriate for the claim.

4.3.3 Summarizing

Although there are similarities (such as the distinction between nutrition claims and health claims) the claims as defined by the EU Regulation 1924/2006 and those permitted by the FDA in the United States differ in details (such as the exact definition) but also in major points. A major difference is that the structure-function claim in the United States differs from the article 13 function claim in the EU Regulation because the structure-function claim does not require any scientific evidence at all. Another major difference between the situation in Europe and the United States is that the FDA accepts claims that are not fully proven (so called qualified claim) as long as a disclaimer explains this lack of substantiation to the consumer.

In other regions of the world there are different laws (see Appendix C for claim types in Japan, Asia, Canada and Australia & New Zealand) and a separate set of rules apply for international trade (Codex Alimentarius), but these will not be elaborated on further, because this report focuses on the regulations as defined in Europe and the United States.

4.4 Scientific Evidence of health claims in the United States

4.4.1 Strength of evidence grading

In 2002 the FDA tried to give better information to Americans so they can make sound dietary decisions to improve their health and reduce their risk of disease. This included a rating system to assess the “weight of the publicly available evidence.” It assigns one of four ranked levels to a health claim. Foods can carry a health claim with a corresponding grade (A, B, C or D) that reflects the quality of the scientific evidence behind the claim, even if the evidence isn't conclusive (Furman, 2004). Table 3 shows the level of Significant Scientific Agreement (SSA) for the assigned grade and some examples of claims in the categories ‘A’ – ‘D’. The rank ‘A’ would be given to a claim which has SSA. This indicates a strong, high quality, relevant and consistent body of evidence that is not likely to be changed by new and evolving science. This means that there is a high level of comfort among scientists that the claim is valid. A level ‘B’ stands for a claim for which the “evidence is not conclusive” (good to moderate level of comfort), ‘C’ for “evidence is limited and not conclusive” (low level of comfort), and ‘D’ for “little scientific evidence supporting this claim” (very low level of comfort).

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Grade	Evidence	Level	Example claim
A	Convincing	highest claim - There is Significant Scientific Agreement for [the claim]	Calcium may reduce the risk of osteoporosis
B	Probable	Good - moderate level of comfort	Consumption of omega-3 fatty acids may reduce the risk of coronary heart disease. FDA evaluated the data and determined that, although there is scientific evidence supporting the claim, the evidence is not conclusive
C	Possible	Low level of comfort	Selenium may reduce the risk of certain cancers. Some scientific evidence suggests that consumption of selenium may reduce the risk of certain forms of cancer. However, FDA has determined that this evidence is limited and not conclusive
D	Insufficient	Very low level of comfort	Consumption of phosphatidylserine may reduce the risk of dementia in the elderly. Very limited and preliminary scientific research suggests that phosphatidylserine may reduce the risk of dementia in the elderly. FDA concludes that there is little scientific evidence supporting this claim

Table 3 Level of evidence for grades ‘A’ – ‘D’ and example claim

4.5 Functional Food, Novel Food, GM-Food, Dietary Supplements and Nutraceuticals

A health claim is a claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health. That means that claims can be on food products that are unprocessed, food with added or altered ingredients (functional foods), novel foods, genetically modified foods, dietary supplements and extracts of foods (nutraceuticals). All these products can have claims, but claims on dietary supplements and nutraceuticals do not fall under the same regulations as those on unprocessed or functional food. This paragraph tries to clarify some terms with the help of a ‘Venn diagram’ (see Figure 1).

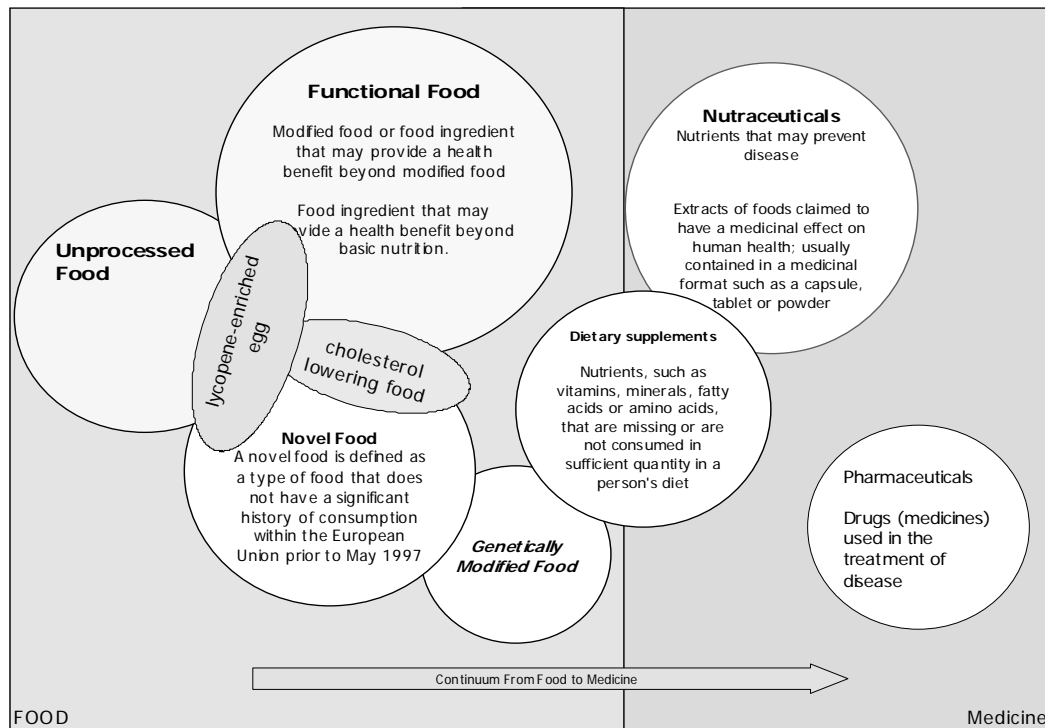


Figure 1 Types of food

One could imagine a continuum between food and medicine. From left to right: non processed food → functional food + novel foods + gm food → dietary supplements → nutraceuticals → medicines.

Non-processed Food

Even regular, non-processed food can have medicinal effects. For example oranges can help prevent scurvy because they contain vitamin-C. Other foods are produced specifically for the purpose of preventing disease, but health claims on these functional foods should not give the impression that the product is a drug that treats a disease. Nutraceuticals (extracts of foods) do claim to have a medicinal effect on human health.

Functional food

Functional food is food that claims to improve wellbeing or health (see Table 4 for examples of functional food). Most of the promised effects of functional food can be instrumentally measured, such as lowering the level of cholesterol in blood, decreasing the blood pressure or increasing the density of bone mass (Lähteenmäki, 2003).

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FUNCTIONAL FOOD	ACTIVE FOOD COMPONENT	TARGET FUNCTION
Yogurts	Probiotics: beneficial live cultures as a result of fermentation or that have been added to improve intestinal microbial balance, such as <i>Lactobacillus</i> sp. <i>Bifidobacteria</i> sp	Optimal intestinal function and intestinal microbial balance
Margarines	Added plant sterols and stanols esters	Decreased LDL-cholesterol (bad cholesterol) Decreased risk of coronary heart disease (CHD)
Omega-3 fatty acids enriched eggs	Omega-3 fatty acids	Control of hypertension, lipids metabolism
Iodized salt	Potassium iodide / iodate	prevent goiters and mental retardation

Table 4 Examples of functional food

Source: (European Food Information Council (EUFIC), 2006)

There are different definitions of functional food from institutions (such as the International Life Sciences Institute (ILSI), American Dietetic Association (ADA), International Food Information Council (IFIC) Foundation, Health Canada) and authors of articles (such as Diplock et al., 1999 cited by Doyon & Labrecque, 2008). The various definitions of functional food have some common features such as:

- The nature of the food: A functional food should be or look like a traditional food.
A functional food can be a natural whole food, a food to which a component has been added, or a food from which a component has been removed by technological or biotechnological means. It can be fortified (adding nutrients to food that weren't originally present) or enriched (adding back nutrients that were lost during food processing). A functional food can also be a food in which the nature of one or more components has been modified, or a food in which the bioavailability of one or more components has been modified, or any combination of these possibilities.

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- Health benefits: These can be physiological benefits, reducing the risk of diseases and preventing or reducing the progression of health problems.
- Function: a functional food should have benefits beyond its basic nutritional functions. The food should be viewed through its function(s) rather than as a product or through its physical attributes.
- Regular consumption: A functional food must be part of a normal diet or fit a normal consumption pattern. There is a high degree of geographical and cultural relativity to this point. A food that is functional in one country may not necessarily be considered functional in another (Doyon & Labrecque, 2008).

A functional food (and the claim on it) may be targeted at the whole population or for particular groups, which may be defined, for example, by age or by genetic constitution.

Novel Food

In the 'Venn-diagram' one type of food can overlap another type of food as is demonstrated with Novel Food. Novel Food is food that did not exist before the year 1997. Novel Food may include genetically modified (GM) food, but some GM-products are from before 1997. Some functional foods such as cholesterol lowering products, may also fall under the category Novel Foods. In Europe Novel Food falls under Regulation EC 258/97. The current procedures for evaluation and authorization of GM foods are laid down in Regulation (EC) 1829/2003 on GM food and feed.

Dietary supplements

A dietary supplement, also known as food supplement or nutritional supplement, is a preparation intended to supply nutrients, such as vitamins, minerals, fatty acids or amino acids, that are missing or are not consumed in sufficient quantity in a person's diet. Some countries define dietary supplements as foods, while in others they are defined as drugs. Dietary supplements may not be represented as conventional foods or as sole items in the diet. Dietary supplements fall under Directive 2002/46/EC in Europe and under the Dietary Supplement Health and Education Act of 1994 (DSHEA) in the United States.

Nutraceuticals

A nutraceutical is a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with foods (capsules). Examples of claims made for nutraceuticals are 'resveratrol from red grape products as an antioxidant', 'soluble dietary fiber products, such

as psyllium seed husk for reducing hypercholesterolemia', 'broccoli (sulforaphane) as a cancer preventative', and 'soy or clover (isoflavonoids) to improve arterial health'. Medicinal claims for foods – i.e. claim, which states or implies that a product has the property of treating, preventing or curing human disease (not reduction of the disease risk) - are prohibited under European Labeling Rules. In order to be permitted to make a medicinal claim, a product must be classed as a medicine in accordance with the definition in the Directive 2001/83/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to medicinal products for human use (Subirade, 2007).

4.6 Conclusion Chapter 4

In the United States the FDA ranks health claims by the amount of scientific evidence for the claims. In the EU-regulation 1924/2006 all claims have to be backed up by scientific evidence. In Europe and in the United states there is a distinction between “nutrition claims” and “health claims”. In the EU-regulation 1924/2006 health claims are additionally subdivided in ‘function claims’ and ‘reduction of disease risk claims’. The United States the “structure function claim” is not evaluated by the FDA for scientific evidence. Functional Foods have health claims, but not all products with health claims are functional foods. Claims on dietary supplements and nutraceuticals do not fall under the same regulations as those on unprocessed food or functional food.

Chapter 5 Consumer understanding of levels of evidence for claims

5.1 Introduction

In this chapter the two questions about consumer understanding of the science supporting the claim are answered. The FDA in the United States uses claims that show the amount of evidence supporting the claim, either by text or by a graphic displaying the level of evidence. Studies about consumer understanding of this SSA is limited to studies from the United States. First in § 5.2 the following question will be answered:

Do consumers see the difference between Scientifically Substantiated Health Claims and those of which evidence is probable, possible or insufficient?

Five studies will be discussed that give insight in consumer understanding of the differences between the levels of science supporting the claim. Those are studies from Derby and Levy (2005) § 5.2, Kapsak et al. (2008) § 5.3, Teratanavat et al. (2004) § 5.4, Hooker and Teratanavat (2008) and Murphy (2005) § 5.5. These studies are discussed in this order, because Kapsak et al. and Derby & Levy (prepared for the FDA and IFIC) are both independent scientific studies while the other three studies are more marketing oriented.

In § 5.6 three studies will be discussed that investigated the influence of the visual form on the understanding of the SSA of health claims:

What influence does the visual form have on understanding the difference between the four levels of health claims?

5.2 Derby and Levy

5.2.1 Introduction

In the working paper entitled “Effects of Strength of Science Disclaimers on the communication Impacts of Health Claims”, Derby and Levy reported the findings of a study that measured the perceived scientific certainty of science supporting a health claim, relevant health benefits, other specific health benefits and importance as part of a healthy diet. Derby and Levy’s results indicated that using just text sentences did not correctly convey the intended strength of scientific support of the health claim to the respondents (Derby & Levy, 2005).

5.2.2 Study

The purpose of the study of Derby & Levy (2005) was to assess the effectiveness of four schemes on conveying certainty of the scientific evidence supporting a health claim. Scheme 1 and 2 both used words describing the claim and the evidence supporting it, but with varied word order: Point-Counterpoint (e.g. “omega-3 fatty acids may reduce the risk of heart disease. The scientific evidence is limited and inconclusive”) and Embedded (e.g. “Limited and inconclusive scientific evidence suggests that omega-3 fatty acids may reduce the risk of heart disease”). Scheme 3 used a ‘Text Report Card’ which stated the long claim (e.g. “A diet high in omega-3 fatty acids may reduce the risk of heart disease. FDA evaluated the scientific evidence and gave it a “B” rating, based on a scale from A (strongest evidence) to D (weakest evidence)”). Scheme 4 used a Graphic Report Card (e.g. “The antioxidant lycopene may reduce the risk of certain cancers, including prostate cancer in men.” FDA Rating of Scientific Evidence: Four-level box with D. ‘Little Evidence’ checked (see Figure 2).

The antioxidant	FDA Rating of Scientific Evidence	
lycopene may reduce the risk of certain cancers, including prostate cancer in men.	A. Strong Evidence	<input type="checkbox"/>
	B. Moderate Evidence	<input type="checkbox"/>
	C. Some Evidence	<input type="checkbox"/>
	D. Little Evidence	<input checked="" type="checkbox"/>

Figure 2 FDA Graphic card

The experiment presented B, C and D level claims and several types of controls, one of the controls was the unqualified claim (the level A claim). For the experiment, the authors selected four dietary substance/disease relationships: the product ‘Calcium-fortified Orange Juice’ was paired with the claim “Calcium may reduce the risk of osteoporosis”, “Light Tuna in Water’ with “omega fatty acids may reduce the risk of heart disease”, ‘Fresh Eggs’ were paired with “A diet high in selenium may reduce the risk of cancer” and ‘Spaghetti sauce’ with “the antioxidant lycopene may reduce the risk of certain cancers, including prostate cancer in men”. Data were collected at five regional shopping malls. There were 1920 respondents above the age of 18, each of whom reviewed two products (one a control condition and one a disclaimer condition). Respondents answered questions about the perceived certainty of science for the claim and about perceived health benefits for the product. Furthermore the consumers rated four questions about relevant health benefits and other health benefits.

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Derby and Levy want to know if the disclaimer schemes as developed by the FDA are effective, therefore they specified in advance what would be the minimal requirements to consider the schemes effective. One of this requirement was that the perceived strength of science conveyed by a disclaimer decreases significantly when the disclaimer says that the evidence is weaker. Results showed that the only schemes that meet this minimal requirement for an effective disclaimer scheme are those that use report card grades to convey strength of science. Text disclaimers (Point/Counterpoint & Embedded disclaimer schemes) failed to reliably convey the intended level of scientific support for a health claim. Since the Point/Counterpoint and Embedded disclaimer schemes did not show significant linear effects of disclaimer level, they were not included in further analysis.

The second performance requirement was the compensatory effects of “correct” level disclaimers. Since an unqualified claim should be a claim that has a strong scientific certainty (and therefore does not require a disclaimer), the disclaimer should diminish certainty about the science supporting the claim. The results show that an unqualified health claim compared to no claim had the expected positive impact on consumers’ perceptions of scientific certainty (See Figure 3). This positive impact was strongest for the less familiar claims (light grey bars in Figure 3). However the effect of an appropriate disclaimer compared to unqualified health claim did not have the expected negative or compensating effect. Only the D-level disclaimer for Lycopene / Spaghetti Sauce had the expected negative effect on consumers’ perceptions of scientific certainty. Sometimes the impact of the disclaimer is even positive instead of negative (in calcium / orange juice and omega-3 / tuna (dark grey blocks in Figure 3).

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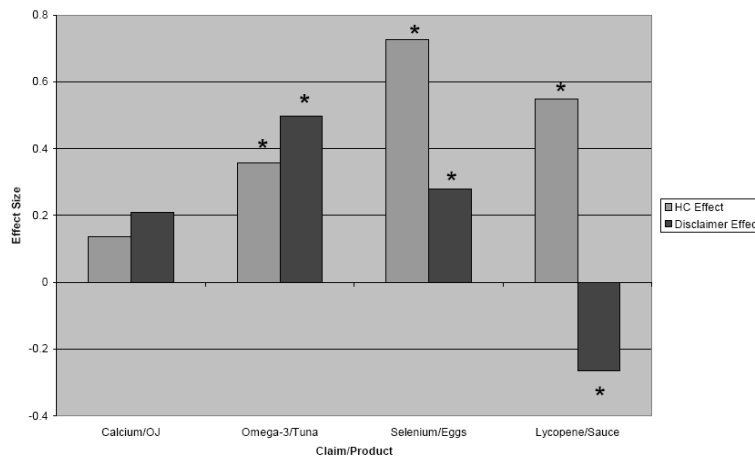


Figure 3 Effects on Perceived Scientific Certainty.

HC (Health Claim) Effect = ‘unqualified health claim’ conditions compared to labels with ‘no claim’ conditions. **Disclaimer Effect** = compensating effect of an appropriate disclaimer (asterisk indicates the significant results) Source: Derby & Levy, p. 23 (2005)

Consumers perception of the products health benefits should parallel their perception of scientific support. Significant reversal would indicate that consumers are making incorrect inferential judgments from the disclaimer. Results show that health claims have positive effects relative to the ‘no claim condition’ for ‘Perceived relevant product health benefits’ (see Figure 4).

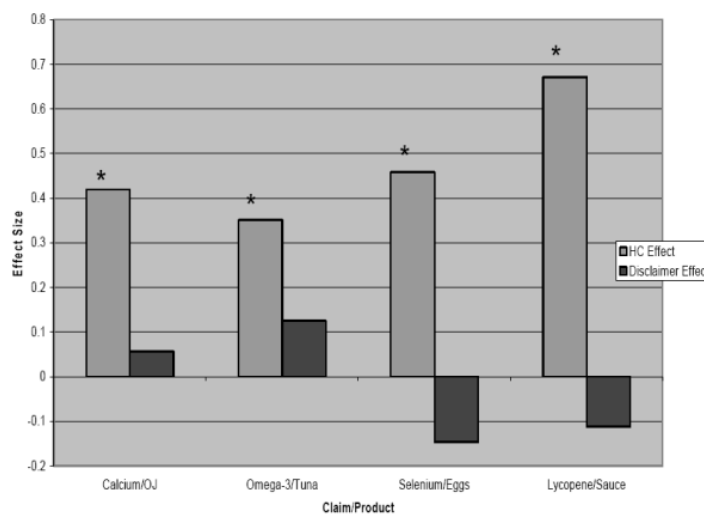


Figure 4 Effects on Perceived Relevant Health Benefits.

Asterisk indicates the significant results. Source: Derby & Levy, p. 25 (2005)

On ‘other health benefits’ it was shown that health claims have positive effects relative to the no claim condition. On ‘Importance of the food as part of a healthy diet’, the health claim effect

reaches statistical significance only in the case of the relationship between Lycopene / Spaghetti Sauce.

5.2.3 Summary

The results suggest that text sentences using adjectives do not correctly convey to respondents the intended strength of science. The schemes using report card grades did convey the intended strength of science, but report card grade disclaimers had unintended effects on respondents' perceptions of scientific certainty relative to unqualified claims, such that respondents attributed more certainty to claims with disclaimers than those without disclaimers. Finally, there was evidence that respondents' perceptions of product health benefits were not diminished by conveying greater scientific uncertainty for a claim. In some cases conveying more scientific certainty for a claim actually led to more negative perceptions of product health benefits (Derby & Levy, 2005).

5.3 Kapsak et al.

5.3.1 Introduction

The International Food Information Council (IFIC) Foundation, with the assistance of Cogent Research of Cambridge, Massachusetts did a study to measure consumer reaction to the FDA-proposed four levels of health claims. This two phased study, was performed in 2005, but published in 2008 as "Consumer perceptions of graded, graphic and text label presentations for qualified health claims". The authors were: Kapsak and Schmidt (both IFIC, Childs (Saint Joseph's University), Meunier and White (Cogent Research). The results were in short that consumers found it difficult to discriminate across four levels and showed inclination to project the scientific validity grade onto other product attributes. Consumers showed preference for simpler messages.

5.3.2 Study

The research started with a qualitative study (qualitative studies use group interviews and generate in-depth understanding of respondents attitudes and actions), to assess consumer understanding, vocabulary, and familiarity with claims. This phase helped with the design and orientation of the second quantitative research phase (quantitative studies use questionnaires that result in quantifiable data).

In the first phase four focus groups (interactive group setting where participants are free to talk with other group members) were carried out in January 2004 (in Boston and Chicago). Consum-

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ers could give open reactions on the claims presented to them. The claim formats included: report card graphic, report card text, embedded claim text. The type of claims that were used are: point-counterpoint, structure/function claim, and nutrient content claim. The consumers in this phase had trouble distinguishing the four distinct levels of science behind the FDA-proposed four levels of health claims, regardless of which language option was used to describe them.

In the next phase a Web-based quantitative survey was conducted among 5,642 adults in the United States of 18 years and older, reflecting key demographics such as gender, age, education and income.

The products tested were Orange Juice with the product-disease relationship Calcium & Osteoporosis, Pasta Sauce with the relationship / Lycopene & Cancer and Breakfast Cereal / with a nonexistent 'Trilinium' & Diabetes relationship.

The tested formats were

- Report Card Graphic (“[Component] may reduce the risk of [disease].” (including check box graphic “B”))
- Report Card Text (“[Component] may reduce the risk of [disease].” “FDA evaluated the scientific evidence and gave it a “B” rating on a scale of...”)
- Embedded (“Promising but not conclusive evidence suggests that [component] may reduce the risk of [disease].”)
- Point-Counterpoint (“[Component] may reduce the risk of [disease].” “The scientific evidence is promising but not conclusive.”)

The researchers examined various types of claims for each ‘product’ (14-20 types of claims per product).

Kapsak et al. (2008) used a “card sorting test” to see if the consumers could distinguish among the four levels of claims (level A B, C and D claim). In this experiment, consumers compared four of the FDA claims, one from each of the four levels of scientific certainty (“A” through “D”). They gave the participants four different kinds of statements and then asked them to put them in order, ‘One’ through ‘Four’. ‘One’ would be the strong evidence and ‘Four’ would be the little evidence. The majority of the consumers incorrectly placed the claims in the order corresponding to the level of scientific evidence. About 36% of the consumers correctly placed the unqualified claim as being the strongest claim (see Figure 5). Only 39% of the consumers put

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a level B claim in a correct place. 78% of consumers cannot correctly sort these four levels, only 22% got it right (Kapsak, 2005).

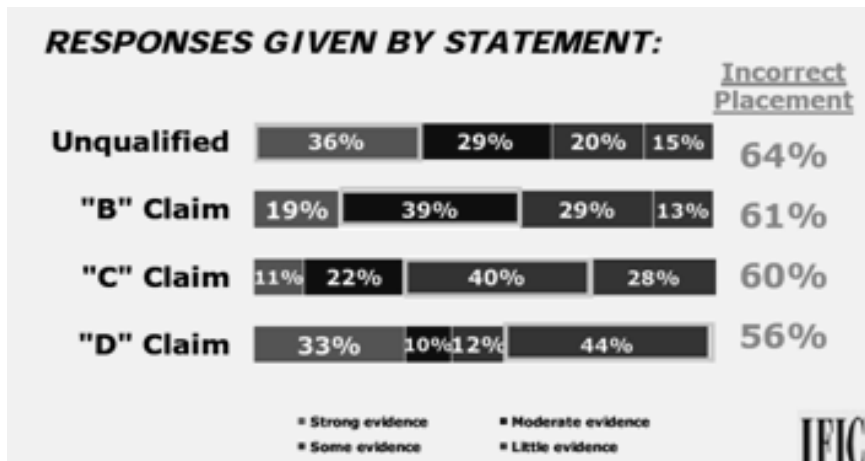


Figure 5 Majority of consumers incorrectly sort claims to SSA level.

After the sorting test they asked the participants if it was easy to sort these claims. Only 26% of the respondents stated it was easy, and only a third of those who said it was easy actually ranked the claims in the correct order of scientific certainty. Source: Kapsak (2005)

Respondents were asked to rate the product for perceived strength of scientific evidence provided to support the claim, and answer questions about the product's perceived healthfulness, quality, safety, and purchase intent. When scoring the various claim presentations on the perceived level of scientific evidence for the claim the investigators found that there is no significant differentiation between the levels B and D. Consumers can distinguish only 2 levels within the Report Card Text format, they tended to group the level A and B claims as having the same level of scientific evidence and to group the level C and D (see Figure 6). In the Point-Counterpoint format they distinguished the level B and grouped C and D together (Point-Counterpoint and Embedded did not include a level A claim in this test) (Kapsak et al., 2008).

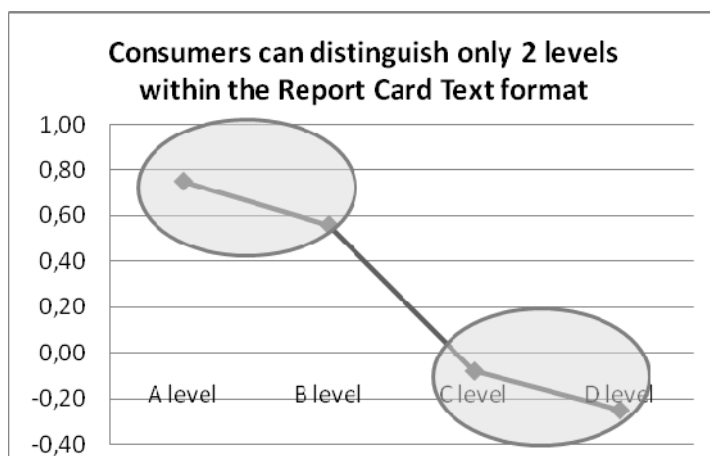


Figure 6 Ability of consumers to distinguish levels within the Report Card Text format

Circles indicate that consumers group level A with B and levels C with D

5.3.3 Summary

Consumers had trouble distinguishing the four distinct levels of science behind the FDA-proposed four levels of health claims regardless of which of several language options were used to describe them (Kapsak et al. 2008).

5.4 Teratanavat

5.4.1 Introduction

Teratanavat has done several studies in conjunction with co-authors with similar design (controlled and randomized experimental design) among undergraduate students in the United states for his dissertation (Teratanavat, 2005) when he was a Ph.D. candidate of the Ohio State University.

The first paper (see § 5.4.2) “Consumer Understanding and Use of Health Information on Product Labels: Marketing Implications for Functional Food is written in conjunction with Hooker, Haugtvedt and Rucker..

In § 5.4.3 the paper of Hooker and Teratanavat (2008) “Dissecting Qualified Health Claims: Evidence from experimental studies” is discussed. This paper is divided in 2 studies: The first study is a repeat of the experiment of Teratanavat et al. (2004) and examines whether consumers understand and can differentiate between qualified health claims. Study 2 compares the report

card (visual aid) with a ‘text only’ claim. The second part of the paper about study 2 will be discussed in the paragraph about the use of a visual aid (§ 5.6).

5.4.2 Study Teratanavat et al.

The paper “Consumer Understanding and Use of Health Information on Product Labels: Marketing Implications for Functional Food” (Teratanavat, Hooker, Haugtvedt, and Rucker, 2004) examines whether consumers can differentiate between various levels of scientific evidence supporting health claims and whether they can distinguish between the new qualified language (disclaimers), approved by FDA in 2002.



Figure 7 Wheat Cracker

Source: Hooker & Teratanavat (2005)

372 undergraduate students participated in the study. The study included a hypothetical functional food product: a wheat cracker containing soy protein. Four levels of health claims were presented on the label of the box and one box had no claim. Each claim contained explicit relationships between nutrients and diseases i.e., isoflavones - heart disease and soluble fiber - cancers, but had different disclaimers explaining the level of scientific evidence supporting the claim. A report card was also included to inform consumers about the various claim levels, ranging from level A to D. Claims with level A have the strongest scientific evidence available, whereas claims with level D are based on very little scientific evidence to date. (see Figure 7). The authors expected the participants that received a stronger claim (e.g. level A) to rate the strength of scientific support for the diet-disease relationship and the expected health benefits for the product higher than those who receive a weaker claim (e.g. level D) on the front label. The findings do not support the idea that the disclaimer and the report card with different grading help participants to understand the different levels of scientific support for the claims. Despite an increasing trend in attitude and purchase intention from the weakest claim (level D) to the strongest claim (level A), there is no statistically significant difference among claim levels when

measuring the strength of scientific evidence supporting the claim, confidence about claim information, and perception of product's health benefit (see Figure 8 and Figure 9).

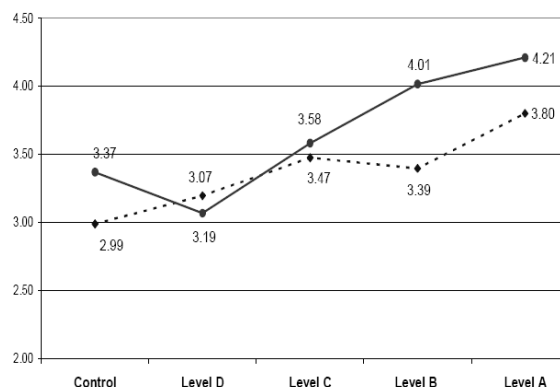


Figure 8 Mean Score for Scientific Evidence.

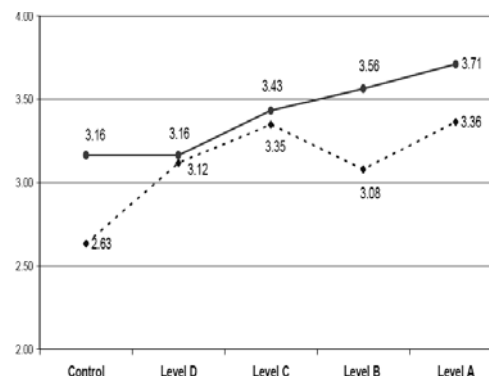


Figure 9 Mean Score for health benefits.

Note with Figure 8 and Figure 9: The accompanying nutrition facts panel on the box included a healthy and an unhealthy version, with the unhealthy one having many calories from fat. The dotted line indicates the box with a claim and an 'unhealthy' nutrition panel, the solid line with the 'healthy' version. Source: Teratanavat, p. 18 (2004)

Level A and B receive similar evaluations, which may imply that consumers are not able to differentiate between these two levels of claims. Consumers are more positive to labels with level C than to level D, but consumers perceive no difference in evaluation of the scientific evidence for the claim between levels C and D (Teratanavat, et al., 2004).

5.4.3 Study Hooker & Teratanavat

The same experiment as from Teratanavat et al. (2004) was repeated by Hooker and Teratanavat (published in 2008). The authors showed 186 students the same packages as in the study of Teratanavat et al. in 2004 (see Figure 7) and with virtually the same results. Attitude was rated significantly lower when respondents were exposed to the qualified level D than to level B, confidence was significantly lower rated when seeing level D than to the unqualified level A. No significant effect was found for various qualified health claims on respondents' perceptions of health benefits of the product.

Although some evidence suggests that consumers react differently to various claim levels, it is not clear whether people understand the difference in the degree of scientific support for these claims, as described in the disclaimer. Despite an increasing trend in attitude from the weakest

claim (level D) to the strongest claim (level A), there is no statistically significant difference among claim levels when using measures of respondents' confidence in the health information and their perception of health benefits of the product. Levels A, B, and C receive similar evaluations, which may imply that consumers are not yet able to differentiate among these levels of claims (Hooker & Teratanavat, 2008).

5.4.4 Summary

Both studies of Teratanavat used the same stimuli, but in the study of Teratanavat et al. (2004) the participants also had the choice between a healthy version of the nutrition facts panel and a unhealthy version. Both studies measured attitude, confidence, and their perception of the health benefits, Teratanavat et al. (2004) also measured the strength of scientific support for the diet-disease relationship. The results of both studies are in line with each other: respondents may be able to differentiate level D (the weakest claim) from other levels. However, there is no evidence to support the hypothesis that respondents evaluate the unqualified claim A and qualified claim levels, B and C differently. Results imply that there is no clear distinction between various qualified health claims. These two studies both used a 'report card' on the wheat cracker box, which is a visual aid to help the consumers make the distinction between level A-D. Therefore the result that consumers can make a distinction between level A and level D is to be expected, since as we can see in the next paragraph § 5.6 about the visual aid, the 'report card' is a key factor in understanding the level of scientific evidence.

5.5 Murphy

5.5.1 Introduction

Murphy (FTC) did a copy test research on consumer perceptions of qualified health claims in 2005 (copy tests evaluate and diagnose the communication power of advertisement).

5.5.2 Study

Murphy reported that consumers do notice and take into account disclaimers concerning the degree of scientific support behind a claim. In this study he used ‘Box Disclaimer’(a strong disclaimer in a text block below the sales message), an ‘FDA disclosure advertisement (ads.)’ (text only version of a FDA disclaimer) and a “Report Card” format (not a visual aid, but a text message that uses one of four letter grades “A” through “D”) to characterize the relative strength of the evidence. He found that the FDA’s ‘report card approach’ to conveying scientific certainty may be almost as effective as stronger explicit disclaimers, such as those used in the Box Disclaimer and FDA Disclosure ads. He concluded that the disclaimer in a qualified claim does not have to be very strongly worded to affect consumer perceptions of scientific certainty.

5.5.3 Summary

The findings of Murphy (2005) indicate that qualified language can have a significant impact on consumer evaluation of scientific certainty. But he also states that the responses were varied. Consumers seeing an ad for a fictitious antioxidant vitamin supplement on average rated the degree of scientific evidence correctly at a “C” level of support, approximately two-thirds of the consumers either overestimated or underestimated the certainty of the science. The research of Murphy differed from the other studies in the United States about SSA, because this research also used dietary supplements. This could well have influenced the results (Murphy, 2005).

5.6 Visual Aid

5.6.1 Introduction

Consumers find it hard to distinguish the four levels of scientific evidence from health claims

Health Claims Report Card		
A	High Significant scientific agreement	1
B	Moderate Evidence is not conclusive	2
C	Low Evidence is limited and not conclusive	3
D	Extremely Low Little scientific evidence supporting this claim	4

Figure 10 FDA graphic.

Source: www.fda.gov

that consist of text sentences. The FDA has designed a health claims report card graphic indicating letter categories, to make it easier for consumers to understand the four levels of SSA (see Figure 10). The levels A-D represent the level of SSA as defined by the FDA. The meaning of the levels have been written to the right in short clear words.

Does a FDA-graphic help consumers to differentiate between health claims that are or are not scientifically substantiated? The FDA-graphic is relatively new, therefore the research about the graphic representation of SSA, is still limited. Only the three studies mentioned in the previous paragraph (Derby & Levy § 5.2, Kapsak et al. § 5.3, and Hooker & Teratanavat § 5.4.3)

gave an answer to the question:

What influence does the visual form have on understanding the difference between the four levels of health claims?

5.6.2 Derby and Levy

In the study of Derby & Levy (2005) (see § 5.2) an earlier version of the FDA-graphic was used, in which a tick was placed in a box next to the FDA rating (see Figure 2). Derby and Levy found in their study that although text disclaimer (the point-counterpoint and embedded schemes) failed to reliably convey the intended strength of science of the health claim to the respondents, report card grades did convey the intended strength of science. Only the report cards using the level A-D grading show a linear result (see Figure 11). Derby & Levy concluded that the only schemes that meet the minimal requirement for an effective disclaimer scheme are those that use report card grades to convey strength of science (Derby & Levy, 2005).

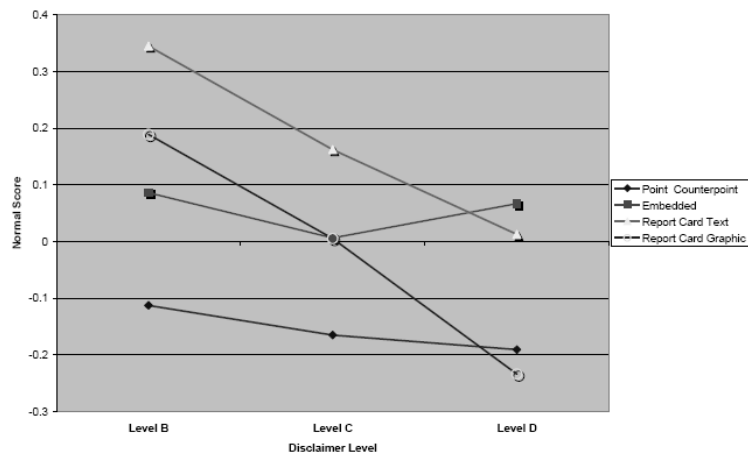
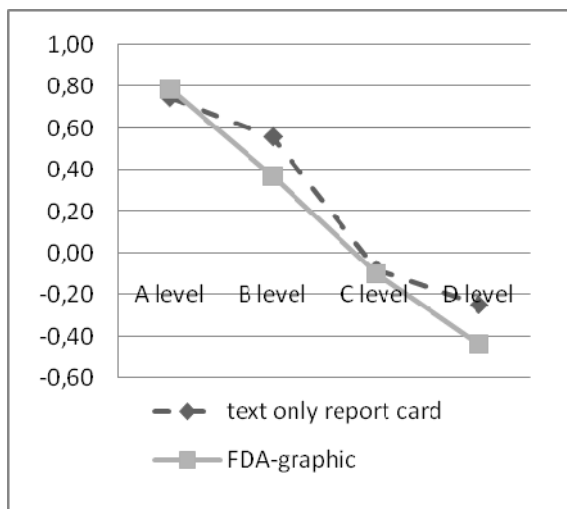


Figure 11 Disclaimer Level Effect by Disclaimer Wording/Presentation Scheme

Source: Derby & Levy, p.21 (2005)

5.6.3 Kapsak et al.



In the study of Kapsak et al. (2008) a report card graphic was compared to the text-only claims. The authors found in their study that consumers can distinguish among the four levels that represent the strength of scientific evidence for a claim when using a report card graphic. Figure 12 (solid line) shows that consumers can better distinguish among the four levels of scientific evidence when presented with the FDA-graphic than with the text only claim (Kapsak et al., 2008).

Figure 12 Consumers can distinguish among 4 levels of science using a graphic representation

5.6.4 Hooker and Teratanavat



Figure 13 Boxes with and without the report card.

Source: Hooker & Teratanavat, 2008

In an additional experiment among 109 students Hooker and Teratanavat (2008) determined how a report card (FDA-graphic) influences consumer response to different claim levels. They compared a level 'A' and 'D' report card versus a text only claim (see Figure 13).

When a report card was included, responses were different from those for labels without a report card. Respondents tended to react more negatively to a level 'D' and more positively to a level 'A' in the presence of a report card (see Figure 14).

For those labels with a report card the participants indicated that the letter grade 'A' is congruent with the health and nutrition information, leading to a strong perception that the product is healthy and good for them. The label with qualified level 'D' made participants skeptical about the health and nutrition level, they felt that the messages were contradictory. The experiment suggests that a visual aid may be an important device to help consumers understand the scientific basis supporting a claim (Hooker & Teratanavat, 2008).

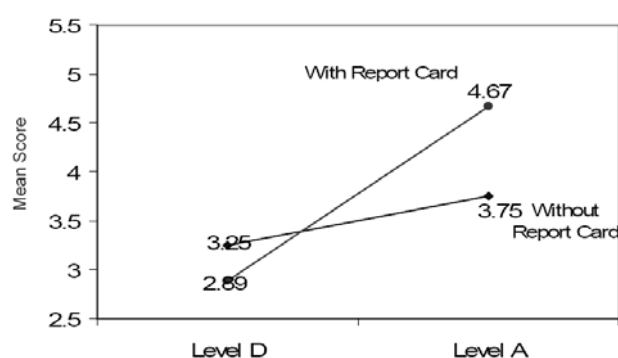


Figure 14 Perceived health benefits with and without a report card.

The rating difference between level 'A' and 'D' is statistically significant when a report card was included, but not statistically significant when a report card was not on the label. **Source:** Hooker & Teratanavat, p. 170 (2008)

5.6.5 Summary

In all these studies the FDA graphic was a better tool than text-only health claims in conveying SSA to the consumer. The visual aid can help consumers to be better informed about the science supporting the claim.

5.7 Conclusion and Discussion Chapter 5

Do consumers see the difference between Scientifically Substantiated Health Claims and those of which evidence is probable, possible or insufficient? No, consumers do not perceive significant differences between the different levels of qualified claims. Consumers are not able to distinguish between the four levels of health claims with the disclaimer language that attempts to explain the strength of science upon which the claim is based.

What influence does the visual form have on understanding the difference between the four levels of health claims? The effect of the visual form on the understanding of the science supporting the claim is that it helps consumers differentiate between the levels A-D.

The five studies that investigated consumer understanding of the scientific evidence for health claims, used dissimilar methods, formats, health relationships, measured variables and statistical methods. For example, variables measured were for Hooker & Teratanavat: attitude, confidence and perceived health benefit, whereas Derby & Levy studied scientific certainty, relevant health benefit, other health benefits and importance in diet. Since the variables and outcomes cannot be compared, only the conclusions of the studies can be compared.

Derby & Levy (2005) and Kapsak et al. (2008) both concluded that the text claims did not portray the difference between scientifically substantiated health claims and those of which evidence is probable, possible or insufficient. Derby and Levy found that the text schemes are not effective in portraying SSA, but the visual schemes are. Kapsak et al. found that the only way consumers could sort out the strength of the evidence was via the report card graphic format. The studies of Teratanavat et al. (2004) and Hooker & Teratanavat (2008) show that consumers can see a difference between the lowest level claim (D) and the highest unqualified claim (A), but there are no significant differences when measuring strength of scientific evidence, confidence or perception of health benefit. Both studies used a report card, which is a visual aid. In an additional experiment Hooker and Teratanavat compared a claim only to a claim with a visual aid and found that only with the report card the respondents could determine the

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difference between a level D and a level A claim. See Table 5 for a summary of studies used in § 4.6.

Author and Date	Participants and Method	Results in short	Visual Aid
Teratanavat et al. 2004	controlled and randomized experimental design 372 students	No statistically significant difference among claim levels when using measures of evaluation of strength of scientific studies, confidence about claim information, and perception of product's health benefit. Level A and B receive similar evaluation. Consumers perceive no difference in evaluation of scientific studies between levels C and D.	
Murphy 2005	shopping mall copy test; 480 participants	Consumers do notice and take into account disclaimers concerning the degree of scientific support behind a claim. It is not necessary to use very strongly worded disclaimers to affect consumer perceptions of scientific certainty.	
Derby & Levy 2005	mall intercept 1920 adult participants	Respondents' perceptions of product health benefits were not diminished by conveying greater scientific uncertainty for a claim. In some cases conveying more scientific certainty for a claim actually led to more negative perceptions of product health benefits.	The only schemes that meet the minimal requirement for an effective disclaimer scheme are those that use report card grades to convey strength of science.
Kapsak et al. 2008	Qualitative study: focus groups quantitative study: web-based survey 5,642 participants.	Consumers had difficulty sorting out the strength of scientific evidence associated with four distinct claim levels.	Consumers can better distinguish among the four levels of scientific evidence when presented with the FDA-graphic than with the text only claim.
Hooker & Teratanavat 2008	controlled randomized experimental design 186 students	Only level D can be differentiated from other levels.	With a report card, respondents rated level 'A' statistically and significantly higher than level 'D', without the report card the difference was not statistically significant.

Table 5 Summary of studies about consumer's ability to differentiate between levels of scientific evidence for claims

Chapter 6 Differentiating between types of claims

6.1 Introduction

Williams concludes in his review of health claims research that “It is a common finding in the United Kingdom, Finland, and France that consumers do not make clear distinctions between nutrition content claims, structure-function claims, and health claims” (Urala, 2003 as cited in Williams, 2006).

In an article about health claims Hasler (2008) summarizes the results from a study of the FDA on consumer understanding of health claims on food packages as “there is little difference in how likely respondents are to recognize the difference between a nutrient mentioned in a food-specific claim, a structure/function claim or a dietary guidance claim” (FDA, 2007 as cited by Hasler, 2008).

Do other researchers confirm these findings? The subject of health claims is narrowly intertwined with marketing. Product labels can be used for information that is beneficial for the consumer, but also for advertisement. Some of the studies have been performed with the interest of marketing as background. In those cases questions such as ‘which claims are better liked by consumers’ have been investigated instead of the question if consumers understand the claims.

Chapter 6 addresses the following questions:

Can consumers differentiate between nutrition claims and health claims?(§ 6.2)

Do consumers understand the nutrient content claim?(§ 6.3)

Can consumers differentiate between function claims and reduction of disease risk claims? (§ 6.4)

6.2 Can consumers differentiate between a nutrition claim and a health claim?

6.2.1 Introduction

Nutrition claims declare that a food contains, or has a high or low amount, of one or more nutrients. That means that a nutrition claim does not say anything about the health effect of that nutrient. A health claim suggest that a beneficial relationship exists between a food product (or a substance in it) and health. This paragraph investigates if people can differentiate between a nutrition claim and a health claim. Six studies will be discussed that used the variables ‘nutrition claim’ and ‘health claim’ in their studies about consumer understanding of health claims: Derby and Levy, the study of AFIC, Murphy et al., the study of FSANZ, Van Trijp & Van der Lans, Singer et al., Vandercammen and Svederberg.

In the United States a ‘nutrition claim’ is called a ‘nutrient content claim’. The terms ‘nutrition claims’, ‘nutritional claims’ and ‘nutrient content claims’ are used concurrently in this report

6.2.2 Derby and Levy

Derby and Levy (2005) answered in their study (see §5.2) the question “Does a nutrient content claim on a food label have the same effect as a health claim?” They measured relevant health benefit (e.g. “how likely is it that eating this food as a regular part of one's diet would reduce the risk of a [here a relevant health condition was named]”), other health benefits (health conditions not mentioned in the claim) and importance as part of a healthy diet. The nutrient content claim was compared with an unqualified claim. The perceived relevant health benefit, other health benefits and importance were significantly higher with an unqualified health claim than a corresponding nutrient content claim. (Derby & Levy, 2005).

6.2.3 AFIC

The Asian Food Information Centre (AFIC) on Consumer Responses to Nutrition and Health Claims in China and Malaysia (2006) tried to gain insight into consumers’ perceptions of functional foods and their disease-health associations and consumers’ response to currently available front-of-pack nutrition information. Four focus group discussions were held in Shanghai and Kuala Lumpur in June 2006. The results revealed that the respondents found information presented in some forms more helpful than others. Nutrient content claim were found to be

useful in helping respondents to identify what nutrients and bio-actives (substances responsible for health benefit) they were consuming and moderately helpful in understanding the nutritional value of food choices. But claims that also described the role of the nutrient or dietary ingredient in relation to health and to bodily functions were found to be even more helpful (AFIC, 2006).

6.2.4 Murphy et al.

Murphy, Ippolito and J.Pappalardo did a study in 2007 about consumer perceptions of heart-health claims for cooking oils and vegetable oil spreads. They wanted to determine whether heart health claims in advertisements for fats and oils that are low in saturated fat or trans fat, will convey to consumers that such products are heart healthy when added to an existing diet. They used a shopping mall-intercept test in 2005 with two products: a cooking oil with a Nutrient Content Claim (e.g. the message “Low in saturated fat. Only one gram per one tbsp serving”) and a Health Claim (e.g. “Reduce the risk of heart disease”), a vegetable spread with a Nutrient Content Claim (e.g. “No trans fatty acids”) and a Health Claim (e.g. “Reduce the risk of heart disease”). Respondents were asked to indicate the heart-health impact of substituting the oil (spread) for butter in cooking. Respondents who understood that butter is substantially higher in saturated fat and cholesterol than the advertised product would be expected to rate this dietary substitution as healthier than simply adding the oil or spread to the diet. Respondents viewed the spread as a less heart-healthy product than the cooking oil. The nutrient content claims (e.g., “low in saturated fat,” or “no trans fatty acids”) exhibited greater impact in the spread tests. Respondents who saw the nutrient content claim rated the spread as more appropriate for use in a diet to lose weight, and as lower in calories relative to butter.

In general the different types of claims did not give significant other results. The mean ratings for the explicit heart-health claims about the heart benefits of adding the oil to the diet, are statistically indistinguishable. Health claims scored higher than the nutrient content claims, and are significantly higher than the control ratings. With the exception of the Health Claim Control (a health claim that does not mention saturated fat), there are no significant differences between any of the health claim and nutrient content claims. The respondents seeing the health claim did not believe that simply consuming the products (adding the oil to a diet because it helps reduce the risk of heart disease instead of substituting normal oil for a lower caloric version) would lower the risk of heart disease (Murphy et al., 2007).

6.2.5 Van Trijp and Van der Lans

Van Trijp and Van der Lans, asked consumers in their study 'Consumer perceptions of nutrition' how difficult or easy it was for them to understand a range of nutrition and health claims and their benefits. First they showed the respondents a 'taste claim' (tastes delicious) and then compared it to one of various nutrition and health related claims. They used five claim types for this study: Content claim (e.g. "Contains ..."), Structure-function claim (e.g. "Helps bodily function, because ..."), Product claim (e.g. "Helps bodily function"), Disease-risk reduction claim (e.g. "Reduces risk, because ..."), and Marketing claim (e.g. "Brings benefit, because..."). (N.B. Product claims and marketing claims are not claims as defined by Regulation 1924/2006). The authors tested yoghurts with different types of active ingredients for various health benefits. The results of Van Trijp & Van der Lans show that different claim types have an impact on difficulty to understand. The products with a nutrition and health claim are slightly more difficult to understand compared to a 'taste claim'. A claim not mentioning any ingredient ('product' claim) is more easily understood than a content claim (most difficult to understand), but this depended also on which benefit was addressed.

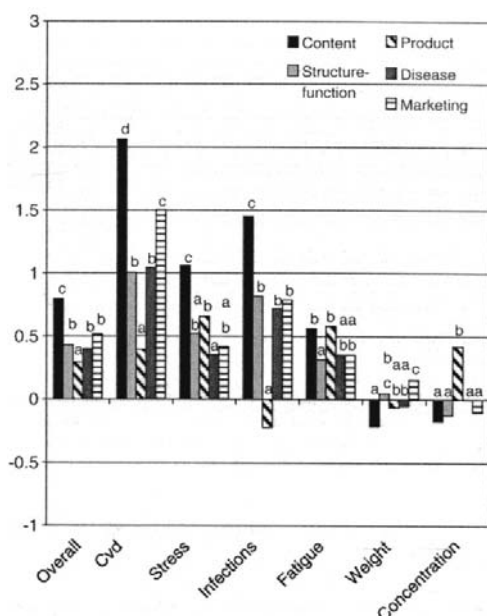


Figure 15 Effect of type of claim x benefit on difficulty to understand.

Source: Van Trijp & Van der Lans, p. 316 (2006)

across different carrier products. This is most likely due to lack of detailed knowledge regarding

The type of benefit that was addressed was found important, in combination with the type of claim. For cardiovascular disease and infections, the nutrient content claim is most difficult to understand for consumers and the health claim the least difficult. For weight and concentration the content claim is the least difficult to understand. For concentration the product claim is the most difficult to understand (see Figure 15). The authors suggest that trying to find similarities and differences between different claim types such as the structure-function claims and reduction of disease risk claims, is not necessarily relevant from a consumer point of view. Consumers do not tend to differentiate between these "subtle" differences, and even when they do, the effects of different claim types on consumer perceptions are not consistent across benefits and ingredients, nor may they be consistent

the exact underlying physiological mechanisms mentioned in the claims. Apparently for consumers it is more about the benefit (health) than about the precise way in which it is delivered (Van Trijp & Van der Lans, 2007).

6.2.6 FSANZ

Food Standards Australia New Zealand (FSANZ) develops food standards (primarily composition and labelling) for food sold in New Zealand and Australia. In a report from 2005 'Quantitative research on consumers' perceptions and use of nutrition, health and related claims on packaged foods', results showed that respondents were able to differentiate between the health benefits of a product with no claim, a nutrition content claim, general level health claims (specifically a nutrition function claim) and a high level health claim (see Appendix C for the exact definition of a 'high level' and 'general level' claims). Any claim communicates greater health information compared to a no claim situation and a high level health claim communicates greater health benefits compared to a general level health claim or nutrition content claim. For example between 5% and 10% of respondents reported 'no health benefits' in the presence of nutrition content, general or high level health claim versus 65% of respondents who reported 'no health benefits' when no claim is present. The results suggested that the general trend was for high level claims to communicate greater health benefits compared to a content claim (FSANZ, 2005b).

In an older quantitative study of FSANZ (2003b) more consumers understood a nutrition claim than a health claim. The nutrition content claim was understood by 63% of the participants, while 56% of consumers thought the health claim was fairly clear (FSANZ, 2003b). Approximately half of the participants misunderstood the meaning of the nutrient claims that were assessed in the study: "lite", "no added sugar", "reduced in salt" and "94% fat free". The main reasons provided by respondents as to why labeling elements were not clear enough were 'vague / confusing terms' (30%) and 'incomplete / not enough detail' (24%) (FSANZ 2003b; NFO Donovan Research, 2003)

6.2.7 Singer et al.

An Australian study of Singer et al. (2006) studied the effect of a health claim on 'light' milk and orange juice supplemented with calcium: "A healthy diet with adequate calcium and vitamin D, and regular physical activity, help to achieve strong bones and may reduce the risk of osteoporosis. [The food] is a good source of calcium".

Most participants understood the health claim well: "High in calcium" was the benefit stated by the highest percentage of participants for both the milk (64%) and the juice products (44%). Second most frequently mentioned was "High in vitamin C" for juice and "Low fat" for the milk. 22% said the product reduces the risk of osteoporosis for the milk and 17% for the juice. 15% said "build strong bones" (for both products). Only a small amount of participants named a 'wrong' ingredient: 5 % of the participants thought the milk and the juice with the claim, contained vitamin D even though that vitamin was not listed in the ingredient list or the nutrient information panel. This suggests that the consumers incorrectly interpreted the health claim as a nutrient content claim about vitamin D (Singer et al., 2006).

6.2.8 Vandercammen

Vandercammen (2003) evaluated the image that consumers have of health claims. The study was for the Centre for Research and Information of Consumer Organization (OIVO). It consisted of a quantitative study among 250 Belgians. In a PowerPoint Presentation he summarized the results. When confronting consumers with sentences that are all specified health claims, barely 16% of consumers identified all claims as health claims. Calcium is necessary for a solid bone structure was best recognized as being a claim by 79%. The claim least recognized (by 26% participants) was "The national food board recommends a national nutrition daily intake of 900 mg of calcium. Product X contains 120 mg of calcium per dl" (People think it's just a dietary advice). When presented with 10 sentences of which 5 were health claims and 4 nutrition claims, and one advertising slogan ("gives you a fresh breath"), 83% of consumers agreed with the health claims "reduces cholesterol", 72% with "increase your resistance to bacteria", 65% with "gives you strong bones", 47% with "gives you energy to start the day" and 47% with "help you combat constipation". Of the 4 nutrition claims 71% participants agreed with the "rich in calcium" claim, 65% "enriched with mineral salts and vitamins", 47% "low salt" and 33% with "light". 23% agreed with the advertising slogan. The lack of difference in the amount of people that agreed with nutrition claims or health claims lead the author to conclude that consumers see no difference between health claims and nutrition claims (Vandercammen, 2003).

6.2.9 Svederberg

Svederberg wrote a pedagogical report for the university of Lund in Sweden: "Consumers' views regarding health claims on two food packages" (2002). She used individual semi-structured interviews among 30 Swedish consumers with widely differing ages and levels of educations. Some participants had food-related health problems such as diabetes, elevated blood pressure,

elevated cholesterol, allergies, were overweight or constipated. She interviewed people after showing them two products already sold on the market in Sweden: a margarine and a bread that contained nutrition claims and health claims. Svederberg did not compare the nutrition claim with the health claims, but investigated the understanding of concepts used in both types of claims.

The following *nutrition claims* were included in the study:

On the margarine:

- With Omega 3.
- A healthy balance between different fatty acids.
- A light mixture of cooking fats. Fat content 40%.

On the loaf of bread:

- + Omega 3.

Most of the participants didn't have any idea about the meaning of Omega-3. About half of the participants, spread over all of the categories of description, understood the concept "low-fat" in the statement "low-fat spread", and the statement "fat content 40%", without any problem. The participant expressed the need for a point of reference to simplify their judgment of the margarine really being a low-fat one. Consumers want to have the possibility to compare.

The following *health claims* were included in the study:

On the margarine:

- Research shows that a low level of saturated fats has a favourable influence on cholesterol levels, and can thereby contribute to the prevention of coronary heart diseases. X has a low level of saturated fats, and also contains the oil Omega 3, of vital importance to health.

On the loaf of bread:

- Palatable bread rich in the type of dietary fibre that might help you to lower cholesterol levels.
- It is important to eat a sufficient amount of dietary fibre so as to keep your stomach in good trim. X is rich in wholesome dietary fibre from the wholemeal rye, oat bran and linseed.
- Some soluble gel-forming types of dietary fibres found in both rye flour and oat bran can contribute to lowering the level of cholesterol in the blood. X contains plenty of fibres of this sort.

The expression "low level of saturated fats" confused a number of the interviewees, some didn't know what it meant. Participants who did know the meaning (those with an illness such as

elevated blood cholesterol and type 2-diabetes), where confused about the lack of mention of unsaturated fat. Some participants needed points of reference to be able to judge if the level of saturated fats really is low. There were three health claims on package of bread, all of them containing the concept of dietary fibre. The importance of dietary fibre for normal functioning of the stomach appeared to be known by all the participants. All of the participants were puzzled about the health which proclaims the bread to be "rich in the type of dietary fibre that might help you to lower the cholesterol level", because none of them had heard about this effect of dietary fibre before and about the concept "soluble gelforming types of dietary fibres" in one of the health claims on the loaf of bread. Most of them were also critical of illness being touched upon in the health claim (e.g. lowering levels of cholesterol). The finding show a generally low understanding of concepts and expressions used in the nutrition claims and health claims on the margarine and the loaf of bread in the study (Svederberg, 2002).

6.2.10 Kapsak et al.

In the study of Kapsak et al. (2008) (see § 5.3 for more about this study) the claims were tested against a control condition. The "control" condition refers to the nutrient content claim. The nutrient content claim makes no reference to science or health association. It merely states a specified nutrient is contained in the food product. The nutrient content claim scored significantly lower on the perception of scientific evidence than "A", "B" and most "C" level claims tested (see Figure 16).

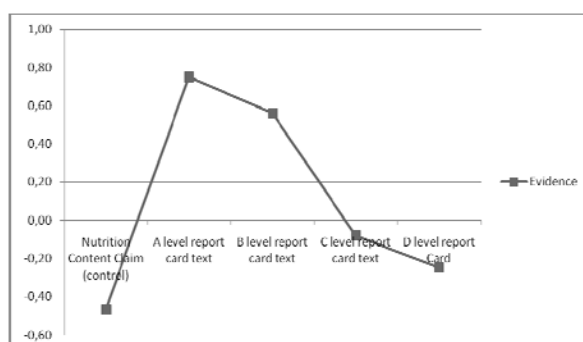


Figure 16 The perception of scientific evidence by consumers is higher in health claims compared to a nutrient content claim

6.2.11 Summary

Health claims communicate greater health benefits compared to nutrition claims (FSANZ, 2005b). A health claim is better understood (Derby & Levy, 2005; AFIC, 2006) especially in combination with benefits as cardiovascular disease. For weight loss and concentration the content claim is easier to understand (Van Trijp & Van der Lans). Murphy et al. (2007) found that with the exception of the 'Health Claim Control' (a health claim that does not mention saturated fat), there are no significant differences between any of the health claims and nutrient content claims. Vandercammen found that consumers cannot distinguish between nutrition and health claims. An older study for FSANZ in 2003 found that more consumers understand a nutrition claim than a health claim (NFO Donovan research, 2003). Kapsak et al (2008) found that the nutrient content claim scored significantly lower on the perception of scientific evidence than most of the tested health claims, which is to be expected, because nutrient content claims do not convey science or health information.

The results of the various studies are mixed, therefore the answer to the question "Can consumers differentiate between nutrition claims and health Claims?" is not completely clear. The trend seems to be that consumers can see the difference between both claims, but more research (preferably from Europe) is needed. Table 6 summarizes the findings about consumers differentiating between nutrition and content claims.

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Authors	Date	Method	Results
Svederberg	2002	30 interviews. Swedes	A generally low understanding of concepts and expressions used in the nutrition claims and health claims.
FSANZ	2003b	1940 interviews. Aus & NZ	More consumers understood a nutrition claim than a health claim
FSANZ	2005b	1044 adults Aus & NZ	Health claims communicate greater health benefits compared to a nutrition claims.
Vandercammen	2003	250 interviews. Belgians	Consumers cannot distinguish between nutrition and health claims
Derby and Levy	2005	mall intercept 1920 adults USA	Health benefits were perceived stronger in a health claim than in a nutrient content claim
Singer et al.	2006	149 interviews Australia	Most understood claim well, 5% if participants incorrectly interpreted the health claim as a nutrient content claim about vitamin D
AFIC	2006	Focus groups Asia	Health claims were found to be more helpful in to understand the disease health association than a nutrition content claim
Murphy et al.	2007	1200, mall-intercept. most females, USA	The average responses on question about the caloric content of consumers assigned to the 'heart-health' claims did not differ statistically from the responses of consumers who saw only nutrient content claims.
Van Trijp & Van der Lans	2007	Internet panel. UK: 1560, US: 1621, Germany: 1620 , Italy: 1566	Claim type does not affect the perception of healthiness, only small effect on difficulty to understand. A health claim not mentioning any ingredient, is more easily understood than a content claim (most difficult to understand). This depended also on which benefit was addressed. For cardiovascular disease and infections, the nutrient content claim is most difficult to understand for consumers and the health claim the least difficult. For weight and concentration the content claim is the least difficult to understand.
Kapsak et al.	2008	Qualitative study: focus groups quantitative study: web-based survey 5,642 participants.	The nutrient content claim scored significantly lower on the perception of scientific evidence than "A", "B" and most "C" level claims tested

Table 6 Summary of studies about consumers being able to differentiate between nutrition claims and health claims

6.3 Do consumers understand the nutrient content claim?

6.3.1 Introduction.

In the previous paragraph (§6.2) we investigated if consumers see differences between nutrition and health claims. In this paragraph the understanding of nutrition claims is investigated in more detail, particularly the understanding of the cut-off points (values) of a nutrition claim such as defined in the Annex of the Regulation (see Appendix B), such as how much does ‘sugar free’ mean (i.e. no ‘more than 0,5 grams of sugars per 100 g or 100 ml’). Also the understanding of complex terms like ‘trans fatty acids’ and ‘omega-3’ is discussed as an obstacle to the understanding of the nutrient content claim. Four studies will be discussed: Byrd-Bredbenner et al. (2000), FSANZ (2003a, 2003b, 2006), Chan et al.(2005) and Vandercammen (2005).

6.3.2 Byrd-Bredbenner

The goal of a UK study of Byrd-Bredbenner, Wong and Cottee (2000) was to evaluate and compare the abilities of women in the UK to assess the accuracy of nutrient content claims using a Nutrition Facts label and those prepared in accordance with the EU Directive of 1990. They tested two claims: “free” (negligible source of [nutrient]; [nutrient] is absent) and “high” (rich in [nutrient] , excellent source of [nutrient] ; 20% or more of Daily Value for that nutrient in one serving). The participants answers were scaled from 0 to 4 with higher scores reflecting a greater ability to judge nutrient content claims truthfulness. This score indicated that the consumers understood the term (they were not briefed about the meaning in advance). It appears that the term “free” is universally understood except in the case where the EU label listed the nutrient as “trace”. Therefore it appears that some consumers do not understand the meaning of “trace”. This study found also that the participants had difficulty accurately judging the truthfulness of nutrition claims with the word “high” in it. The term “high” is not universally understood. For example when the food contained 24% of the Recommended Daily Value of riboflavin, they did not consider the food to be “rich in riboflavin”. Consumers need to know the criteria for making these types of claims to be able to accurately assess them (Byrd-Bredbenner, Wong & Cottee, 2000).

6.3.3 FSANZ

In 2002 FSANZ conducted a qualitative and quantitative study (FSANZ 2003a, 2003b) with consumers in Australia and New Zealand.

Qualitative study

The qualitative study “Qualitative consumer study on nutrient content claims” (FSANZ 2003a) consisted of 10 focus groups of women aged 35-64 yrs who were highly health conscious; they discussed various nutrient content claims. Respondents usually verify nutrition content claims on the front via the nutrition information panel on the back, to determine whether the claim is ‘correct’ and/or to assess the nutritional value of the whole product. A ‘reduced’ claim (e.g. ‘reduced in cholesterol’) was understood to mean lower than the ‘normal’ version. A ‘no added’ claim (e.g. ‘no added sugar’) was unequivocally understood to mean that the product had only ‘natural’ sugar with nothing added. It was also widely understood that ‘no added’ claims did not imply that the product had ‘none’ of the nutrient in question, although there was an underlying belief that these products would be ‘low’ in the claimed nutrient. Participants were far less skeptical of ‘no added’ claims than most other claims and the use of the nutrition information panel to verify ‘no added’ claims was therefore less necessary.

Consumers are confused about the meaning behind the various words and terms used in content claims such as ‘high’, ‘low’, ‘reduced’, ‘source of’, ‘light’ etc. There is also no awareness or understanding that there are ‘rules’ around the use of nutrition content claim (FSANZ, 2003a).

Quantitative study

The quantitative study “Quantitative research with consumers” (FSANZ, 2003b) consisted of 1940 door-to-door interviews. The study identified difficulties for consumers in correctly interpreting nutrition content claims; approximately half of the respondents misunderstood the meanings of a range of claims tested. Stimuli were shown to participants using 2-dimensional pictorial show cards. The claims investigated were: “lite”, “no added sugar”, “reduced in salt” and “94% fat free” (see Appendix B for the meaning of such claims). Consumers found it difficult to interpret most claims. For the ‘no added sugar’ claim on tinned peaches, 38% gave the correct response: “Could be either a low, medium or high sugar food”. For ‘reduced salt’ on baked beans, 11% gave the correct response: “Contains more salt compared to similar food labelled ‘low salt’”. For ‘94% fat free’ on rice crackers, 16% of the participants gave the correct response that the food is a ‘medium fat food’. The consumers did better with the ‘lite’ claim on strawberry yoghurt: a majority (77%) answered correctly that the claim referred to the fat content (and not to sugar energy, colour, fruit content, any of the given choices). Still 29% felt the claim was very confusing and 45% a bit confusing (FSANZ, 2003b).

In 2006 FSANZ commissioned a study to explore the impact of the disclaimer ‘contains natural sugar’ on products with the claim “no added sugar”. The results were that the disclaimer had a positive, but small effect, on the interpretation of the no added sugar claim. With the disclaimer there was a high level of recognition that products with a claim of no added sugar did in fact contain some sugar. Respondents had difficulty though in correctly assessing the sugar content of the products (TNS Social Research, 2006).

6.3.4 Chan

In an Australian study among 36 participants in focus group discussions, Chan, Patch and Williams (2005) looked into the beliefs and attitudes of Australian consumers to nutrition claims about fat content of products. Ten products were provided for consideration, carrying different types of nutrition claims about the fat content: Fat Free, No Fat, Low Fat, Low in Fat, Lite, ExtraLight, 97% Fat Free, 92% Fat Free, 50% Less Fat, and the Heart Foundation Tick. Participants answered, among others, the question: “What does the claim mean?”. When viewing at the comments made by the participants, four main beliefs related to fat and a healthy diet were identified: ‘Good fat and bad fat’, ‘Reduce saturated fat’, ‘Reduce total fat’ and ‘Fat should not be excluded’. Participants didn’t understand the cut-off points in the claims. For example participants *remarked*: “*We used to always laugh at these when they say 50% less fat, you don’t know where they are starting from*” and “*See, I look at the [Brand Name] when I see the 25% of what? That doesn’t mean a thing*”. Some claims about fat were seen as misleading even when legally permitted. For example participants regarded ‘Fat Free’ as often being a false claim, because of small amounts of fat declared in the nutrition information panel (Chan et al., 2005).

6.3.5 Vandercammen

Vandercammen (2005) investigated nutrition claims in a study about nutrition labels for the Centre for Research and Information of Consumer Organizations (OIVO) under the Belgium population. His research was divided into a qualitative and a quantitative phase. Generally speaking, Vandercammen found that claims about the absence or reduction of some ingredients may seem misleading. Terms such as X% less fat are impossible to verify. They never mentioned in relation to which reference the product contains less fat and thus it cannot be determined whether the claim is correct. Other claims can be misinterpreted by consumers. Products containing ‘80% fat-free’, still contain 20% fat, despite the fact that the claim the idea gives that the product is healthy and low fats. Few labels contain information framing claims as

part in a broader context of healthy eating habits, despite consumer demand for more information.

Qualitative phase

Many consumers do not understand the scientific terminology such as ‘Omega 3’. Multiple respondents did not notice the presence of a substance in the food product, even though the substance was the subject of a claim (e.g. Omega 3). The products that indicate the presence of an added substance (e.g. calcium), lead to rejection or at least distrust in most respondents. Nevertheless the respondents do not check the claim information against the nutrition label. ‘Light’ products (either less fat or less sugar) proposed a greater interest for most respondents, respondents more often check the accuracy of the ‘light’ claim on the nutrition labels. Products that indicate addition of a substance, are more attractive to people that have some deficit (due to health problems). These people use these products to get the feeling that they are taking care of their health by eating something that enhances the effect of the medicines. None of the respondents proclaimed to use such products for preventive reasons or buying them for their children. For example, no respondent showed any interest in ‘added calcium’ and its reinforcing effect on the skeleton of the child during his growth. Light products on the contrary, provoked interest in all types of respondents, in the context of a diet, for weight loss and for health problems.

Quantitative phase

The respondents found it difficult to read food labels and they contain unknown terms. Consumers are affected by claims when purchasing certain products. In the mind of the consumer claims convert a food product into medicine. The consumer sees the product as essential to health and therefore he feels that he is encouraged (almost obliged) to use the product with a claim over a product without claim (Vandercammen, 2005).

6.3.6 Summary

Nutrition claims are claims that tell us about what the product contains. The cut-off points (criteria about how much of the nutrient or substance the product should contain per reference amount of food) of terms frequently used in the nutrient content claims like ‘high’, ‘a good source’ or ‘light’ are defined in the Annex of the Regulation 1924/2006. But even if the consumer has heard about the Regulation, he/she certainly does not carry the Annex to the shop. Therefore it is necessary to give more information about the values of these terms on the labels with the claims. Another problem for the consumer are difficult terms used in nutrition claims. If

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the product states ‘low in cholesterol’ most consumers might understand what that means, but terms such as ‘trans fat’ are more confusing to some. When the terms in nutrition claims and the risks or benefits of the substances in the products are not well understood, the claims are also not well understood. Table 7 summarizes the results about consumers understanding the nutrition claim.

Authors	Date	Method	Results
Byrd-Bredbenner et al.	2000	Face to face interview, 50 women between the ages of 25 and 45 years	"free" is understood, "high" is not understood
FSANZ	2003a	Qualitative study, Six groups in Australia; Four groups in New Zealand.	Consumers are confused about the meaning behind the various words and terms used in content claims such as ‘high’, ‘low’, ‘reduced’, ‘source of’, ‘light’ etc
FSANZ	2003b	Quantitative study, door-to-door interviews, 1940 participants aged 18 or over	Consumers found it difficult to interpret most claims.
FSANZ/TNS Social Research	2006	Online survey, 993 participants aged 18 years and over	Respondents had difficulty though in correctly assessing the sugar content of the products
Chan et al.	2005	Qualitative study focus group discussions, Australian 26 female and 10 male participants aged 20–80 years	Participants didn’t understand the cut-off points in the claims
Vandercammen	2005	Qualitative study: 2 groups Quantitative study 486 Belgians	Participants found the terminology used in nutrition claims difficult.

Table 7 Summary of studies about consumer’s understanding of the nutrition claim

6.4 Can consumers differentiate between function claims and reduction of disease risk claims?

6.4.1 Introduction

Function claims (article 13 of the EU-regulation) are claims about what a product does to improve physical or mental health. The structure function claim should not lead a consumer to believe that the product prevents, treats, cures a disease (France & Bone, 2005). Reduction of disease risk claims (article 14 of the EU-regulation) indicate the reduction of one of the factors that might lead to a disease. The reduction of risk of that disease may occur only in certain groups (for instance women) and the effect may be only statistically visible in the long term. The question asked in this paragraph is:

Do consumers see the difference between function claims and reduction of disease risk claims?

Since there are not examples yet of the article 13 and 14 claims to be tested, this chapter discusses the small amount of literature found that looks into differences between the understanding of health claims and function claims as they existed between 2000 and 2008. *Enhanced function claims, high level claims and structure function claims are comparable to the function claims; because of the limited amount of literature found, they will be discussed here as well.*

6.4.2 FSA Forum Qualitative

The Food Standards Agency (FSA) published a final report in 2002 about health claims on food packaging (FSA, 2002). The goal of this qualitative study was to understand if consumers can differentiate between four different levels of claim. The four types of claims that are investigated in this study are: functional, enhanced function, health reduction of disease risk factor, health reduction of disease risk. The difference between functional claims and enhanced function claims is that the former are more general about what a substance does and the latter more specific for the product. This subdivision is not made at the present moment, neither is the use of the word ‘factor’ in the reduction of disease risk health claim, but this research does investigate if consumers see the difference between function claims and reduction of disease claims.

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Respondents were asked to sort and group the health claim statements on the basis of their understanding of the health benefit claimed, which claims similar / different and why.

The respondents' understanding of the claims revealed a multitude of dimensions on which claims were being compared / differentiated. There was very little consistency in how the claims were grouped (i.e. which claims were considered similar in terms of the health benefit the product would give). For example, some of the claims were grouped together as offering the same benefit: 'because they're all about reducing' or 'because they are all to do with cholesterol levels'. Some claims were grouped together 'because they're positive statements

Across the sample, the following dimensions were used, some more frequently than others, as a basis for grouping the claims:

- maintaining vs. changing / altering / improving
- prevention / protection vs. cure
- general health / body as a whole vs. specific organ / part
- new and interesting vs. known / familiar
- benefit now vs. benefit in the future
- medicinal vs. nutritional
- proven / substantiated vs. unproven / unsubstantiated
- persuasive / convincing vs. unbelievable / nonsensical
- positive vs. negative
- definite vs. nebulous
- wordy vs. concise and clear
- marketing speak / hype vs. informative / neutral
- specific group (e.g. kids, older women) vs. everyone
- me vs. not me (relevant condition)
- have bought vs. might buy vs. would avoid

The research indicates that the consumer's perception of health claims is much less coherent, consistent and 'organized' than the way the European Commission groups the claims. Respondents rarely if ever grouped the claims in that way or used anything approaching the criteria of the Commission to distinguish between the claims. Instead, they drew on a variety of perceptions, assumptions and prejudices to make their own sense of what was being offered.

The research suggests that a hierarchy of claims based on a purely scientific structure misses the point that the consumer's response is often of a non-scientific nature. Consumers have other priorities, and they look at claims in a wider and often 'fuzzy' context. Despite this lack of explicit fit, the group of claims classified as 'Health Enhanced Function' do seem to form a

coherent group in consumers' minds. Consumers see them as the strongest set, offering certainty and an attractive promise that the product will definitely deliver. Many consumers believe that manufacturers would not be able to make such claims if they were not true and if they did not rest on properly conducted tests with proven results. This apparent consonance between the European Commission's and the consumer's grouping only occurred in this one instance of heart/cholesterol claims, and seems to be more about confident verbs and adverbs than about any understanding of the underlying scientific basis for the grouping (FSA, 2002).

6.4.3 Kapsak et al.

In the study of Kapsak et al. (2008) (see § 5.3 for more about this study) it was found that structure-function claims were perhaps the most popular of all claims tested in the groups. Most consumers prefer short claims and the structure function claims in the test were shorter than the health claims in the test. Also the consumers liked that the structure function claims are more about promoting health, and not mentioning a disease. For example, several consumers mentioned that they did not like to see the word "cancer" on their food products. Consumers rate products with Structure-function claims as high as those with any of the Unqualified "A" level health claims tested for healthfulness, quality, and safety. Structure/function claims score significantly higher than Nutrient Content claims on perceived strength of scientific evidence. The overall difficulty of consumer perception may be indicative of their desire for simpler language in food and health messages as seen in structure-function claims (Kapsak et al., 2008)

6.4.4 Camire and Dougherty

Camire and Dougherty (2005) tested the knowledge of 136 food professionals about claims to measure their knowledge of regulations about nutrition labels. They asked respondents how many of the presented claims were approved by the FDA at the time (2001) and offered 7 multiple choice options. Ten percent of the respondents correctly identified the number of claims approved (14). Nearly 43% of the survey participants replied that they did not know how many claims were permitted.

The survey presented several claims for foods and dietary supplements, and respondents were asked to classify each claim as an approved health claim, a structure-function claim, or an unapproved claim or "don't know or not sure". The three approved health claims were readily recognized by survey respondents. However, structure-function claims and unapproved claims were more confusing. For example, although the health benefits of fish oil are well-known, no

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claim was approved in 2001 for fish oil and reduced risk for CHD (in 2002 a qualified health claim was approved by the FDA “Supportive but not conclusive research shows that consumption of EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) omega-3 fatty acids may reduce the risk of coronary heart disease”, but no specific claim for fish oil is permitted). Only 17% of respondents correctly identified the fish oil claim as not permitted (see Table 8). The structure-function claim for Echinacea and the immune system was incorrectly identified as a not permitted claim by 57% of the survey respondents. Three unapproved claims— cranberries and urinary tract infections, carrots and skin, and fiber-rich foods and colitis—were correctly identified by most respondents (Camire & Dougherty, 2005).

Displayed claim	Number of responses			
	Health claim	Structure-function claim	Not a permitted claim	Don't know / not sure
A diet containing adequate amounts of calcium may prevent osteoporosis	91**	31	12	2
Bilberry anthocyanins promote healthy vision	8	41*	71	16
A diet with adequate folate may help reduce the risk for neural tube birth defects	92	29	5	10
Fish oil contains omega-3 fatty acids that may reduce the risks for coronary heart disease	76	34	23	3
Cranberries prevent recurrence of urinary tract infections	15	29	83	9
Echinacea enhances the immune system	9	37*	77	13
Dietary antioxidants, including vitamin C and beta-carotene, destroy free radicals in cells	15	56*	51	14
Vitamin A in carrots helps maintain healthy skin	18	49	63	6
Diets containing foods that are good sources of potassium & low in sodium may reduce the risk of high blood pressure and stroke	78	37	13	8
Diets rich in plant foods & low in fat and cholesterol may reduce the risk of colitis	29	33	53	21

Table 8 Recognition of health- and structure function claims

Source: Camire & Dougherty (2005)

Figures in bold indicate the interpretation of “correct” answers. Those followed by asterisks apply to dietary supplements only; double asterisks indicate claims that apply to foods and supplements.

6.4.5 Bech Larsen and Grunert

Bech-Larsen and Grunert (2003) examined attitudes relating to perceived healthiness of functional food across different cultures. In this study among American, Danish and Finnish respondents, they investigated the attitudes of two claims that are similar to the function claim and the disease reduction claim, only they called it physiological claim and prevention claim (now referred to as function and reduction of disease risk claims). The two function claims they used were ‘Omega-3s increase blood circulation in the legs’ and ‘oligosaccharides encourage growth of beneficial bacteria in the gut.’ The two reduction of disease risk claims were ‘Omega-3s reduce the risk of heart disease’ and ‘oligosaccharides reduce risk of cancer in the gut’. In all three countries both kinds of claims have a positive influence on consumers’ perception of the healthiness of foods. Danish and Finish respondents score the reduction of disease risk claim marginally higher than the function claim (Bech-Larsen & Grunert, 2003).

6.4.6 Lin

In 2006 the FDA performed an experimental study of health claims on food packages among 1077 participants of a Global Opinion Panel in the United States. The study examined consumer perceptions of health claims and other health messages (nutrient content claims, structure function claims) on the front of food packages. The main research objective was to evaluate and compare consumers reactions to food-specific health claims that do not mention the substance that underlies the diet disease relationship (e.g. “yoghurt may reduce the risk of osteoporosis”) and substance specific health claims that do mention the substance (e.g. “calcium-rich foods, such as yoghurt may reduce the risk of osteoporosis”).

When a nutrient or health benefit is lesser known (potassium) or unknown (a fictitious ingredient lysoton), respondents are more likely to recognize the nutrient from a substance-specific health claim than from a structure/function claim. There is no difference in how likely respondents are to recognize the nutrient between a food-specific health claim and a structure/function claim (see Figure 17).

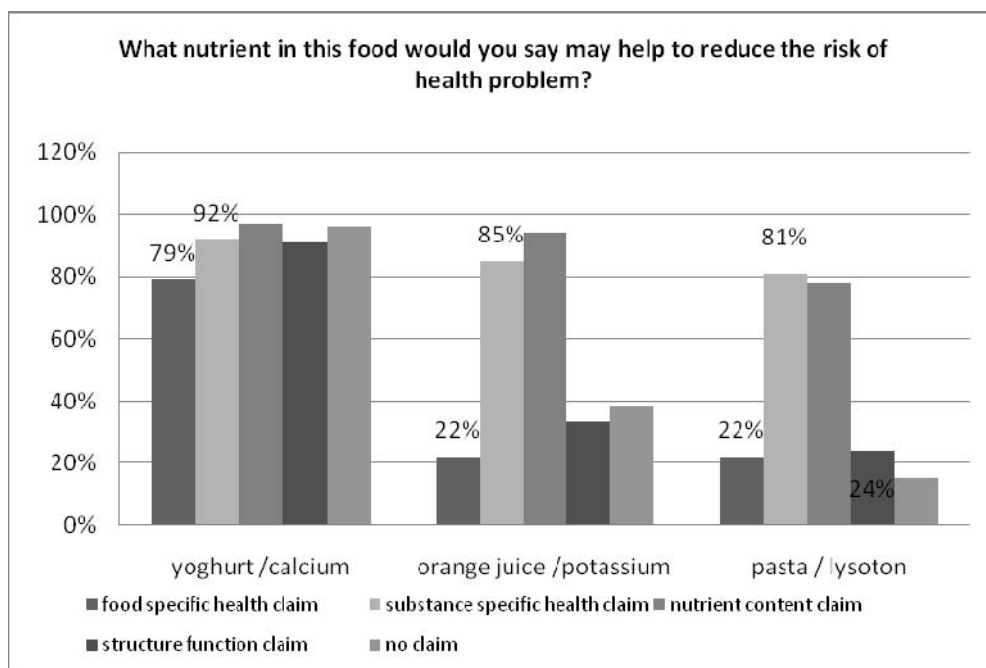


Figure 17 Nutrient responsible for reduction of risk of health problem

The likelihood of recognizing that there are other foods that may offer the benefit stated on a product package does not differ between the health message they see (substance-specific health claim, food-specific health claim, structure/function claim). Lin found that mentioning the substance responsible for the health claims makes it much clearer to identify the substance responsible for the beneficial effect, so consumers can also buy another product which has the substance with the stated health benefit (Lin, 2007).

6.4.7 Vandercammen

In the previously mentioned study of Vandercammen from 2003 (see 6.3.56.2.8) the author also investigated several health claims, which included function claims and reduction of disease risk claims. The author did not make an analysis on the difference between function claims and reduction of disease risk claims, however the results of the calcium-bones combinations are very interesting. 79% of consumers agreed with the function claim 'calcium is necessary for a solid bone structure' and 64% agreed with 'taking in much calcium strengthens bones'. But only 58% agreed with the same disease-substance combination when the claim was phrased as a reduction of disease risk 'sufficient calcium may help to reduce the risk for osteoporosis'. Perhaps the differences are not statistically significant, but one can at least see a trend that the health claims about calcium seem to be more agreed upon when phrased as function claims in comparison to reduction of disease risk claims (Vandercammen, 2003)

6.4.8 Summary

As with the question about differentiating between nutrition and health claims, the question if people can differentiate between function claims and reduction of disease risk claims cannot be decisively answered. Consumers cannot see the difference in scientific support between the unqualified health claims and the structure function claims (Kapsak et al., 2008). Consumers do make a distinction between the types of claims, but not based on understanding the underlying scientific basis for the grouping (FSA, 2002). Food professionals can recognize which claims are approved or unapproved, but they have difficulty with the structure-function claims (Camire & Dougherty, 2005). Function claims and reduction of disease risk claims have a positive influence on consumers' perception of the healthiness of foods (Bech-Larsen & Grunert, 2003). For a summary about consumers differentiating between function claims and reduction of disease risk claims, see Table 9.

Authors	Date	Method	Results
FSA Forum Qualitative	2002	Qualitative study 130 participants United Kingdom	Consumers do make a distinction between the types of claim, but not based on understanding of the underlying scientific basis for the grouping of claims. Instead, they drew on a variety of perceptions, assumptions and prejudices to make their own sense of what was being offered
Bech Larsen and Grunert	2003	Interview, 500 participants from United States, Denmark, Finland	Function claims and reduction of disease risk claims have a positive influence on consumers' perception of the healthiness of foods. Reduction of disease risk claims are rated higher than the function claim.
Camire and Dougherty	2005	Internet survey 136 food professionals United States	Respondents could recognize the approved and unapproved claims, but had difficulty with the structure-function claims
Vandercammen	2003	250 interviews Belgians	More people agreed upon a calcium claim when phrased as a function claim in comparison to the reduction of disease risk claim.
Kapsak et al.	2008	Quantitative web- based survey 5,642 participants United States	Consumers do not perceive a difference among unqualified text health claims and structure-function claims with respect to the scientific evidence

Table 9 Summary of studies about consumers being able to differentiate between function claims and reduction of disease risk claims

6.5 Conclusion Chapter 6

Can consumers differentiate between nutrition claims and health Claims?

The answer is that there is a trend that consumers can see the difference between both claims, but more research is needed. Health claims give more understanding of a relationship between the product and a health condition. A health claim is better understood (Derby & Levy, 2005; AFIC, 2006) especially in combination with benefits as cardiovascular disease. For weight and concentration the content claim is easier to understand (Van Trijp & Van der Lans, 2007). In one study consumers did not distinguish between nutrition and health claims (Vandercammen, 2005). A health claim communicates greater health benefits compared to a nutrition content claim according to a study of FSANZ in 2005, but in an older study of FSANZ (2003) more consumers understood a nutrition claim than a health claim.

Are nutrition claims understood?

The answer is no, consumers need more help in understanding nutrition claims. Consumers do not understand the cut-off points frequently used in the nutrient content claims like 'high', 'a good source' or 'light'. (Byrd-Bredbenner 2000; FSANZ 2003a; Chan et al., 2005). Consumer found many terms (such as trans fat) used in nutrition claims difficult (FSANZ 2003b; Vandercammen, 2005). When the terms in nutrition claims and the risks or benefits of the substances in the products are not well understood, the claims are also not well understood.

Do consumers differentiate between function claims and reduction of disease risk claims?

The answer is maybe. Not enough research is done, especially in Europe, to be able to draw a conclusion. Consumers do make a distinction between the types of claim, but not on the right premises (FSA, 2002). Function claims and reduction of disease risk claims have a positive influence on consumers' perception of the healthiness of foods (Bech-Larsen & Grunert, 2003). Consumers cannot see the difference in scientific support between the unqualified health claims and the structure function claims (Kapsak et al., 2008). Food professionals can recognize which claims are approved or unapproved, but they have difficulty with the structure-function claims (Camire & Dougherty, 2005)

Chapter 7 Front-of the pack logo

7.1 Introduction

Nutritional information about food products are hard to understand and take time to read.

Consumers may be discouraged from using labels if they are perceived as being time-consuming and difficult (Health Canada, 2002). A quick front of the pack nutrition label saves time for the consumer who wants to make a choice while shopping. But these logos also portray a healthy image of the product and as such they are considered to be a health claim.

The question discussed in this chapter is:

Do consumers understand a health claim if it is presented with a front of the pack logo?

There are many commercial and non-commercial logos used on products and some are endorsed by national and international health organizations (See Table 10).

Examples of logos on food labels	
 Pick the Tick In Australia and new Zealand: 'Pick the Tick'	In Sweden: 'Keyhole Symbol'  Ik Kies Bewust / ChoicesTM logo  
 In the Netherlands: 'gezonde keuze klavertje'	

Table 10 Examples of logos on food labels

There are icons (logos) by manufacturers (Pepsico “Smart Choice”), trade group (The Whole Grain Council Stamp), Third Parties (American Heart Association “Heart Check”), supermarkets (‘Gezonde Keuze Klavertje’ Albert Hein) and restaurants. A complete list of available ‘front of pack’ nutrition schemes is presented on the website of the European Heart Network who reviewed these labels in 2007. The review also gives a list of criteria of health schemes used in different countries and the criteria of the symbols (European Heart Network, 2007)

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A number of private schemes from food industries are used for the basis for nutrition labeling and nutrition symbols, for example:

- Tesco Supermarkets, United Kingdom - In addition to the total amount of sugar, fat, saturated fatty acids and salt per serving, the label provides the percentage of the Guideline Daily Amount (GDA) (Tesco, 2007).
- Kraft Foods, Sensible Solutions - Front-pack labeling program. The nutrition criteria are category-based (12 food groups). Criteria for Sensible Solution products are derived from the 2005 Dietary Guidelines for Americans, as well as authoritative statements from the United States FDA, National Academy of Sciences, nutrition and health experts and other public health authorities, and include calories, fat (including saturated and trans fatty acids), sodium and sugar (Kraft Foods, 2008).
- Albert Hein, an Ahold supermarket in the Netherlands, adopted a 'healthy choice' (clover) logo for their home-brand products (Albert Hein, n.d.) It is a category-based scheme (23 food groups), using product criteria from the Netherlands Nutrition Centre, and the Swedish green 'keyhole' scheme (EFSA, 2008)

Choices™

The Choices™ stamp ("Ik Kies Bewust" (IKB-logo) in Dutch) is a 'front of pack' logo initiated by Dutch food industries (Campina, Friesland Foods en Unilever) and supported by the Netherlands Ministry of Health. The symbol is visible in around 50 countries and has applied for authorization of a claim referring to article 13 from the EU-regulation (EC) No 1924/2006 on nutrition and health claims made on food (Ministerie van Volksgezondheid, Welzijn en Sport, 2007). The logo provides a quick, simple way for consumers to identify food and drinks based on four major "nutrients of concern" -- trans fat, saturated fat, sodium and added sugars. Since a little while the symbol is also visible on packaged unprocessed food such as vegetables.

In order to qualify for the logo Unilever products must meet strict nutrition criteria on all four nutrients set by Unilever's global Nutrition Enhancement Program (NEP), a product benchmark program based on 20 different sets of dietary guidelines from worldwide health organizations, including the dietary guidelines in the United States. In the U.S. Unilever also limits the use of the Choices logo to those products that have less than 60 mg of cholesterol per serving, to be consistent with FDA guidelines.

Those criteria are periodically reviewed by an independent international scientific committee made up of leading scientists. The criteria were established by a board of independent scientists and based upon World Health Organization (WHO) recommendations. It is a mixed (hybrid) scheme with both general criteria and product group specific criteria. Saturated and trans fatty acids, sodium and added sugar were selected as the key nutrients for which intake should be limited. Dietary fiber was included in the system as a positive key nutrient. In total, 16 ‘basic’ food groups and 6 ‘non-basic’ food groups were identified, including all food products available for the consumer. At least 20% of the basic foods and 10% of the non-basic food products on the market should comply with the criteria (Choices International Foundation, 2007).

The Choices Foundation is consulting with Albert Heijn on union of the standards behind the two health logos. Depending on the outcome of these preliminary discussions maybe a joint logo is feasible (Ik Kies Bewust, 2008).

This chapter will start to discuss the results of a study about front-of the pack logo’s from Feunekes et al. (2008), a program about the choices logo from the RVU (2008) and then the chapter continues with the studies of Lanumata et al. (2008), Signal et al. (2008) and the Norwegian Food Safety Authority (2008) about the ‘pick the tick’ logo (§ 0). Then we will discuss the changes in behavior that the logo has resulted into (7.3), how much the logo is used in daily life (§ 7.4) and if more information on the back of the pack would be helpful (§ 7.5)

7.2 Consumer understanding of front of the pack logos

Feunekes et al.

The impact of eight front-of-pack nutrition labeling formats that differed in complexity was investigated across four European countries (UK, Germany, Italy and the Netherlands) by Feunekes et al. (2008). The labeling formats used in the study were Healthier choice tick (a); Health protection factor (b); Stars (c); Smileys (d); Multiple traffic light (e); Wheel of health (f) (See Figure 18) ; Multiple Choice Tick and GDA scores (see Figure 19).

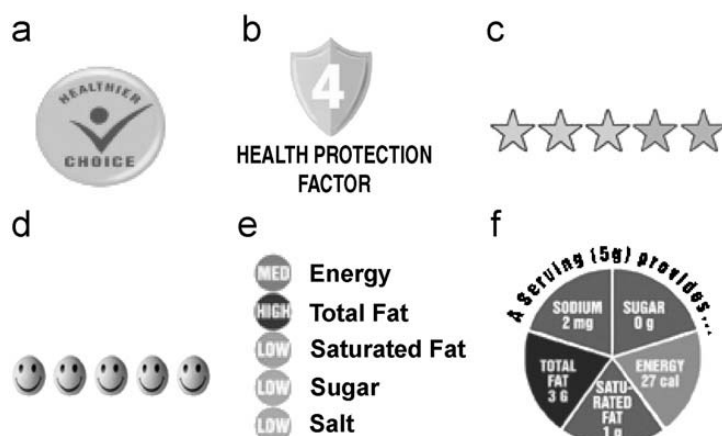


Figure 18 Nutrition labeling formats.

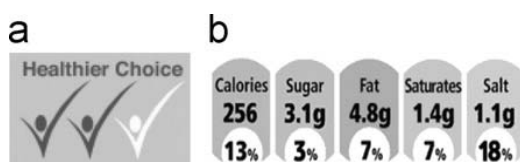


Figure 19 Additional nutrition labeling formats: a) Multiple Choice Tick and b) GDA scores.

Source: Feunekes et al., p.3; p.9 (2008).

Participants evaluated several products (healthier and less healthy variants of the same product category) with a front-of-pack nutrition labeling format. The results indicated minor differences in consumer friendliness and usage intention between simpler (such as Healthier Choice Tick, Smileys and Stars) and more complex front-of-pack nutrition labeling formats (such as Multiple Traffic Light, Wheel of Health and GDA scores). All labels were easy to understand, but the health protection factor was somewhat less understood. Those participants that perceived themselves as least knowledgeable about health and nutrition found the 'Wheel of Health' (f in Figure 18) more difficult to understand than 'Smiley's' (d in Figure 18). The Smileys and Stars (d and c in Figure 18) differentiated the healthy food from the less healthy food better than other formats. Participants needed significantly less time to evaluate simpler front-of-pack labeling compared to the more complex labeling format. Thus simpler front-of-pack labeling formats seem more appropriate in a shopping environment where quick decisions are made. Feunekes et al. found that most participants thought that the nutrition label formats compared products across all food products and only a minority thought that the format compared products within one category. All labeling formats were able to help consumers to differentiate between healthier and less healthy variants of the same product category. Participants' intention to use less healthy

products decreased, whereas participants' intention to use healthier products hardly increased. This suggests that the labeling formats do not encourage overconsumption of particular products (Feunekes et al., 2008).

RVU

The choices label has a potential to confuse the consumer. In September 2008 a documentary television series of the RVU "Keuringsdienst van 'Waarde", discussed the topic of the Choices logo ("Ik Kies bewust Logo"). In the program a reporter said 'if the logo is on the front of the package, the product is healthy and you can eat all you want from it'. Later in the program things were put in the right perspective, but the statement might represent consumer believes that a product with the symbol is so healthy one can eat unlimited amounts of it. The reporters were also surprised that pure (organic) fruit juice as such was not eligible for the logo. The product could only qualify for the logo when the juice was enriched with extra fiber to match the criteria for fiber (RVU, 2008).

Lanumata et al.

Māori, Pacific and low-income New Zealanders rarely use nutrition labels despite their significantly higher risk of nutrition related disease than the risk of New Zealand Europeans. Front of pack labeling would assist them to purchase healthy food. These communities recommended a nutrition label that is simple, colorful and easy to understand. In the study "Front of Pack Labelling from the Perspectives of Māori, Pacific and Low-income New Zealanders" from Lanumata, Heta, Signal and Haretuku (2008), one participant preferred the simplicity of the 'Pick the Tick' by the Heart Foundation. She said *"a Tick showed it was a healthy choice, simple yet clear and saved time trying to identify every nutrient"* (Lanumata et al., 2008).

Signal et al.

In a previous related study "Perceptions of New Zealand nutrition labels by Māori, Pacific and low-income shoppers" by Signal et al. (2008) the findings were that the Tick logo was considered simple, although there was some confusion around what the logo meant. There was some confusion about whether products that do not carry the Tick were healthy or not. A number of participants felt that products without the Tick were inferior and *"...not good enough to eat – we will all die 'cause we can't afford to buy [the Tick]"*. Māori participants seemed to realize that products with the Tick should be eaten in moderation, depending on what the product is. One

participant was unsure whether the Tick logo was intended for young people, or just for people with heart problems (Signal et al., 2008).

Norwegian Food Safety Authority

The European Heart Network published a summary in 2008 of original research from December 2006 -June 2008 on consumer preferences and use of Front of Pack nutrition schemes (Stockley, Kaur & Rayner, 2008). One of the cited studies is by the Norwegian Food Safety Authority (2008) "Health labeling of food". The series of reports included a qualitative study and a quantitative study. The studies investigated 'traffic lights' and health logos ('Swedish keyhole', 'Heart Symbol' and 'Pick the tick'). The results from the qualitative study was that a positive health logo enabled consumers to find quickly and easily healthy food products. The traffic light system was seen as more complicated and time consuming, and attitudes towards it were affected by consumers' knowledge and interest in nutrition. The results of the quantitative study was that the health logo was perceived as quick and simple to use, but giving less information than traffic lights. Both the labels were seen as largely helpful by the majority of respondents (Norwegian Food Safety Authority, 2008 as cited by Stockley et al., 2008)

7.3 Changes in behavior

That the pick the tick program is not only an effective way to communicate healthy choices, but also in actual changes in behavior, can be concluded from the results of two studies that were performed to see if the 'pick the tick' symbol had effect on lowering the intake of salt.

In a study by Young and Swinburn (2002), the impact of the Pick the Tick food information program on the salt content of food in New Zealand was investigated. The main outcome measure was the amount of salt not added to food products. In a one-year period from July 1998 to June 1999 the Pick the Tick influenced food companies to exclude approximately 33 tons of salt through the reformulation and formulation of breads, breakfast cereals and margarine (Young & Swinburg, 2002).

Another case study of sodium reduction in breakfast cereals and the impact of the Pick the Tick food information program was carried out in Australia by Willams, McMahon and Boustead (2003). The conclusion was that the Pick the Tick was an effective catalyst for a substantial reduction in the salt content of a major food category, with an impact nearly twice that seen in

the foods reformulated to meet the requirements of the Tick program itself (Williams et al., 2003).

7.4 Logo use

How much do consumers actually use these logos? In a survey from the Canadian Council of Food and Nutrition (CCFN) of 2006, label use was investigated. The healthy/better choice slogan, symbol or logo are read by slightly less than half of the population, which is the same amount that reads the health claim, but less than those who read nutrient claims (64%) (CCFN, 2006).

A majority (85%) of the Dutch consumers recognizes the Choices™ (IKB) logo (Elsevier Voedingsmiddelen Industrie (EVMI), 2007), but recognition may not mean much. Signal et al. reported: “Despite the fact that many participants recognized the Tick logo and some were able to explain its meaning, 90% reported ‘never’ using the Tick to guide food choices.” The vast majority of Maori, Pacific and low-income participants did not use the Tick to assist them in their food purchasing, a significant finding when compared with National Heart Foundation data suggesting that 73% of shoppers claim to use the Tick ‘regularly’ or ‘sometimes’ (National Heart Foundation, 2005, as cited by Signal et al., 2008). Many participants stated they could not afford products with the Tick because the Tick does not often appear on low-cost brands (Signal, 2008)

7.5 More information on the back of the pack

A front of the pack symbol is liked by many consumers. But not all consumers are the same. Some are satisfied with little information, while others like to be more informed (Svederberg, 2002, p31,50, 53; Grunert, 2008). Williams (2005) reports that consumers prefer split claims, with a short statement on the front of the package and more detailed information provided elsewhere on the package (Williams, 2005). Feunekes et al. came to the same conclusion: for consumers who like to be more informed a more complete information can be put on the back of the pack label. For the front of the pack the simplest form of logos like a healthier choice tick is better because difficult symbols take time to read (Feunekes, 2008).

7.6 Conclusion Chapter 7

A front of the pack logo is a useful tool for consumers to make a fast choice between similar products during hectic shopping. Results can be measured as seen from the reduction in the use

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of salt in products carrying the tick. Table 11 summarizes the results of the studies about consumer understanding of front of the pack logos.

Author	Year	Method	Results
Feunekes et al.	2008	Shopping experiment and pair claim UK, Germany, Italy, Netherlands	All tested labeling formats were able to help consumers to differentiate between healthier and less healthy variants of the same product category. Participants needed significantly less time to evaluate simpler front-of-pack labeling compared to the more complex labeling format
Lanumata et al.	2008	Focus groups New Zealand	A Tick showed it was a healthy choice, simple yet clear and saved time trying to identify every nutrient.
Signal et al.	2008	Focus groups New Zealand	There was some confusion around what the logo meant. There was some confusion about whether products that do not carry the Tick were healthy or not. One participant was unsure whether the Tick logo was intended for young people, or just for people with heart problems
Norwegian Food Safety Authority	2008	Focus groups Norway	The health logo was perceived as quick and simple to use, but giving less information than traffic lights

Table 11 Summary of studies about consumer understanding of front of the pack logos

Chapter 8 Inferred bias

8.1 Introduction

Consumers can interpret claims beyond the scope of the claim, for instance draw conclusions about the overall product's safety and quality. In a review article about consumer understanding of nutrition and health claims, Leathwood et al. (2007a) described the following types of inferred bias developed by Roe et al. 1999:

- A 'positivity bias' occurs if a consumer makes a positive inference based on the mere presence of the claim. For example, almost any claim can be expected to enhance the consumer's ratings for the product.
- A 'halo effect' occurs if the consumer generalizes positive perceptions to other product attributes. For example, a low cholesterol claim may lead someone (via spreading activation) to presume the product is low in fat even though this is not mentioned in the claim.
- A 'magic bullet' effect occurs if a consumer attributes inappropriate health benefits to the product. For example, a consumer might infer from a low cholesterol claim that the product will help against cardio-vascular disease.
- An 'interactive effect' occurs when the claim interacts with the processing of other information on the package. For example the information in the claim might lead the consumer to ignore the nutrition facts panel information that perhaps he/she would normally look at (Roe et al., 1999, as cited in Leathwood et al. 2007a).
- A 'boomerang effect' can occur when a health warning produces a more positive response to the product instead of the expected negative response to the warning. For example when a warning statement was present, drinkers of wine had more favorable attitudes towards wine and more positive perceptions of health-related benefits (Kozup et al., 2001, as cited in Leathwood et al. 2007a).

The question answered in this paragraph is:

Do consumers interpret claims as they are intended or do they make biased inferences?

8.2 Results

Positive bias

A ‘positive bias’ effect was found in a report from FSANZ: respondents had a higher intention to buy a product containing a claim (any claim) (FSANZ, 2005b).

A ‘positive bias’ was seen in a large study conducted for the FDA in the United States in 2006. When a product features a health claim, respondents view the product as healthier and state that they are more likely to purchase it. More consumers would be tempted to choose a product if it carried a health claim--even if that claim was fictitious. The study included a fictitious ingredient Lysoton. 19% of the respondents said they were “very likely” to purchase the pasta with the fictitious ingredient in it when the label stated "Lysoton-rich foods, such as pasta, may reduce the risk of heart disease" (Lin, 2007).

Halo effect

Wansink and Chandon (2007) found in previous research support for the argument that consumers generalize health claims inappropriately. A study of Andrews, Netemeyer, and Burton (1998) demonstrated the ‘halo effect’: consumers believe that foods low in cholesterol are also low in fat (Andrews et al., 1998, as cited in Wansink & Chandon, 2007). In a study of Wansink, consumers believed they ate an energy bar containing soy and rated it higher in nutritional value, but lower in taste (Wansink 2003 as cited in Wansink & Chandon, 2007). These halo effects even apply to restaurant menus. For instance Kozup, Creyer, and Burton found that adding a “heart-healthy” sign on a menu reduced the perceived risk of heart disease when objective nutritional information was absent, even though it was placed next to an objectively unhealthy menu item (lasagna) (Kozup et al., 2003 as cited in Wansink & Chandon, 2007).

Wansink and Chandon (2007) demonstrated inferred bias in their own study about the effects that health claims from two main fast foods restaurant have on consumers. Consumers estimate that familiar sandwiches and burgers contain up to 35% fewer calories when they come from restaurants claiming to be healthy, such as Subway, than when they come from restaurants not making this claim, such as McDonald’s. In a subsequent experiment the authors also set up two menus from two fake restaurants. One menu had “healthier” fare, while the other had not so healthy items on the menu. When students were given a sandwich and drink - labeled with one or other fake restaurant names - they automatically assumed the one with the healthy restaurant

label had fewer calories. The sandwich and drink were identical (only the labels were different) (Wansink & Chandon, 2007).

Williams (2006) concluded in a review that health claims increase consumers' expectations about the healthiness of a product and produce more positive attitudes toward its nutritional value. This influence can result in a general "halo" effect, affecting belief about nutritional attributes unrelated to the health claim (Ford et al., 1996, as cited in Williams, 2006).

Kapsak et al. (2008) also found the 'halo effect' in their study. Consumers appear to carry their perception of the associated letter grade over to other product attributes such as healthfulness, quality and safety of the product. This association is incorrect, there was no difference in the products safety or quality, the only differences were in the level of science for the proposed health claims (Kapsak et al., 2008).

An Australian study of Singer et al. (2006) did not find a 'halo-effect' The participants in this study did not incorrectly attribute other benefits to the products. For example they did not think that orange juice fortified with calcium had any particular benefits as in lowering the risk of heart attack, nor that it could be a sole substitute for dairy products.

Magic Bullet

In a Nordic study entitled 'Consumer acceptance and trust: Recommendations for using health-related claims in marketing' Grunert found that there is no 'Magic Bullet' effect. If the consumer read a label with a claim about cardiovascular disease, the consumer did not think it would also help against dementia or weight loss and vice versa. He also found that a product with a claim was less liked (attractive/healthy/natural/tasty) than a product without a claim, and he described this as a 'negative halo effect' (Grunert, 2007).

Interactive effect

An example of an 'interactive effect' that Williams refers to as a 'halo effect' in his review (Williams, 2005), was found in a study conducted by the US Federal Trade Commission among 1700 consumers in shopping malls. This study found that even warning statements about risk-increasing nutrients in a product (such as a high sodium content) were overlooked by a significant proportion of consumers in the presence of a health claim (Murphy, Hoppcock & Rusk, 1998 as cited by Williams, 2005).

Boomerang effect

A ‘boomerang effect’ was shown in the study of Derby and Levy (2005) (see § 5.2). One of the labels contained the relevant health claim that stated that the nutrient “may reduce the risk of the relevant disease or health related condition”, the other label contained the relevant health claim without “may”. Expressing the substance/disease relationship without “may” leads to significantly lower ratings of the perceived importance of the product to a healthy diet, an indication of an unexpected negative effect for health claims (Derby & Levy, 2005).

Halo effect and Boomerang effect

In a study of Murphy et al. (2007) about consumer perceptions of claims on cooking oils they answered the question “Do health claims cast a halo over a product’s perceived healthiness?” There was evidence of a ‘halo effect’ from the ‘no trans fatty acids’ claim when testing the effect on weight loss if one was to use sunrise spread on a regular basis. The positive messages about ‘trans fatty acid content’ or ‘heart health’ were causing some consumers to infer incorrectly that the product was lower in calories and better suited for a weight loss program than ordinary spreads. Respondents were also asked to estimate the absolute number of calories in a serving of Sunflower Fields oil or Sunrise Spread. The Sunflower Fields oil gave very limited evidence for a ‘halo effect’ and the Sunrise spread revealed no evidence of a ‘halo effect’

A ‘boomerang effect’ was shown when a ‘Calorie Disclosure’ failed to perform its intended task: it registered the highest mean response, where it should have been lower. This indicates that respondents on average overestimated the appropriateness of using the spread in a weight program. The ‘disclosure of total fat’ did not eliminate the ‘halo effect’ from the nutrient content information.

Murphy et al. summarized that the nutrient content information concerning trans fatty acids contributed to ‘halo effects’, but there was no clear ‘halo effect’ in the various health claim and nutrient content claim treatments. Adding an explicit heart-health claim to a nutrient content claim (such as ‘low in saturated fat’ or ‘no trans fats’) did not change consumer perceptions of the caloric content of the tested products or otherwise distort perceptions of the products’ overall healthiness. Murphy et al. concluded their research that the inferred bias was not significant enough to justify additional information such as a ‘disclosure’ (Murphy et al., 2007).

8.3 Conclusion Chapter 8

When comparing all these results, it appears that the grading of claims and the applied language has an effect on consumer perceptions, and there are some biased inferences such as the “halo effect”, “boomerang effect” and a “magic bullet effect”. More studies are necessary to explain some contradicting results such as the ‘negative halo effect’.

Chapter 9 Influences on consumer understanding of health claims

9.1 Introduction

As mentioned earlier, the EU-regulation demands that “The use of nutrition and health claims shall only be permitted if the average consumer can be expected to understand the beneficial effects as expressed in the claim”. But in practice the average consumer does not exist. Not only do consumers differ in education, knowledge and experience, also demographic factors (e.g. age, education), cultural factors and personal believes (interest in health food) can cause consumers to read, interpret and understand health claims differently.

The question asked in this chapter is:

Is the perception, interpretation and understanding of health and nutrition claims influenced by other factors than knowledge, such as demographics variables, health status, cultural differences or other variables?

This chapter to discuss the influence on consumer understanding of demographic, health issues and cultural differences (§ 9.2) between consumers. Then the chapter continues with the influence of knowledge, familiarity with the claim (or the substance mentioned in it) and the positive or negative health image of the carrier (§ 9.3). The chapter ends with the understanding of the terminology used in the claim (may or not may, alternative language, positive / negative framing (§ 9.4).

9.2 Demographic differences

9.2.1 Introduction

In this paragraph the demographic differences will be discussed. The socio-demographic factors in this chapter include gender, age, class, education, health status and location (§ 9.2.2).

Derby and Levy

In the study of Derby and Levy (2005) respondents who are between 30 and 45 years old are more likely to respond positively to health claims than other age groups. Respondents with more education are apparently more skeptical of health claims than those with less education. Sex and

health status do not appear to have consistent effects on the communication impacts of food label health claims (Derby & Levy, 2005).

Gyselaers

Gyselaers (2006) investigated if the impact (more persuasive, attractive, credible and/or likely to buy) of health claim is higher in women than in men, and if the impact of health claims is bigger in users of functional food than on non-users. She hypothesized that the impact of health claims will be bigger on respondents with more education. Her findings were that women do not have a bigger confidence in the health benefit of functional food. Neither age, education, nor gender are associated with perceiving health benefits from functional food differently. More people who know functional food think they are beneficial for the health than people who are not acquainted with functional food. Education has no impact on the evaluation of the health claims, but more people with a higher education know functional food. Age has a role in the perception of health claims, but only in the case of fruit-juice, not in other functional foods. Respondents above 50 years of age, find health claims less attractive, credible and persuasive and are less inclined to buy than respondents of the age of 40. Gyselaers concludes that believe in the health benefit is more important in the acceptance of functional food than socio-demographic factors (Gyselaers, 2006).

FSANZ

In a study of FSANZ “Quantitative research on consumers' perceptions and use of nutrition, health and related claims on packaged foods” respondents were asked to indicate who would be most likely to receive a benefit from eating one of the four versions of bread carrying either no claim, a ‘nutrition content claim’ (e.g. Bread with ‘high in omega’ 3) a ‘function claim’ (e.g. Bread with ‘high in omega. A diet high in omega helps maintain healthy veins and arteries’) or a ‘high level claim’ (e.g. Bread with ‘high in omega. A diet high in omega helps reduce the risk of heart disease’). Age had an impact on what type of claims respondents thought would be beneficial. Respondents aged 25-34 years of age were significantly more likely to indicate that the product with ‘no claim’ or a ‘function claim’ would be of benefit to ‘all types of people’, when compared to older respondents (65 years and over). Older respondents (45 years and over) were more likely to indicate that the product with a ‘high level claim’ would be beneficial to ‘all types of people’. There was some effect of health status in this study: respondents with heart disease were significantly more likely to indicate that the product with ‘no claim’ (in comparison

to the content claim or health claim) would be less likely to be of benefit to ‘people with particular health problems’ (FSANZ, 2005b).

Forum Qualitative (FSA)

A ‘forum qualitative’ study for the FSA (2002) noted that the gap between the ‘scientific hierarchy’ and consumers’ structuring of the claim did not seem to be a function of any intellectual or educational deficit in their respondents. Nor were there any significant differences by gender, class or life stage. The study reported that the respondents’ personal experience of the relevant concerns (i.e. if they or someone close to them had issues with heart, bone or gut functioning) made a difference in the confidence with which they approached the claims and their understanding of the vocabulary. The personal experience did not make them any more likely to group the claims in line with the ‘scientific hierarchy’ though (FSA, 2002).

Camire and Dougherty

Camire and Dougherty studied food science professionals and found that they are not confident in their understanding of health claims. Although some claims were readily recognized, others were not as well understood. In 1999, the FDA approved a claim for soy protein and reduced risk of CHD, based on a daily intake of *25 g of soy protein*. Foods bearing the claim must be low in saturated fat and cholesterol, and low in total fat if not made from whole soybeans. An additional requirement is that each Reference Amount (RA) contains *6.25 g of soy protein* because the FDA concluded that at least 4 servings of soy per day would be needed to provide a total of 25 g. Forty-eight percent of the survey respondents correctly answered a question regarding the ability of a food containing only *5 g of soy protein* to bear the soy health claim. Only 17% thought that the food could bear the claim, and 34% were not sure (Camire & Dougherty, 2005). If one keeps in mind that the respondents in this survey were food science professionals, it would not be surprising if less educated consumers find it even more hard to understand such claims.

ACCLAIM Study (Lähtenmäki & Grunert)

In May 2008 and in March 2009 Lähtenmäki presented two lectures about how consumers perceive health claims and healthiness in foods and showed some results from an unpublished survey from 2007. This survey (coordinated by Lähtenmäki) was financed by the Nordic Innovation Centre (NICE) and was carried out with 4612 respondents each in Denmark, Sweden, Norway, Finland and Iceland. The consumers participating in the survey were shown a number of products such as bread, yogurt and pork chops. Each category contained one product without

health claims and a number of products with claims either about the functional ingredient, its function, the result and combinations of these three elements. An example of a general health claim is “contains beta glucan (the health-active ingredient) which helps control the cholesterol level in the blood (the function), which lowers the risk of cardiovascular diseases (the result)” (the ingredient claim is comparable to nutrition claim, the health outcome claim is comparable to the reduction of disease risk claim and the function claim).

In a video/ PowerPoint presentation about this study by Grunert (2007), he found that there are two types of consumers: consumers who like a short claim, a claim that only gives the information that is relevant for him (e.g. “This product is good for the heart”) and the other type, consumers, mostly women (See Figure 20), that want as much information as possible (what ingredient, e.g. “Contains omega 3 which may help to keep arteries clean and therefore promote cardiovascular health”). The study also found that women generally were the ones to notice health claims (Grunert, 2007; Pedersen & Grunert , 2008)

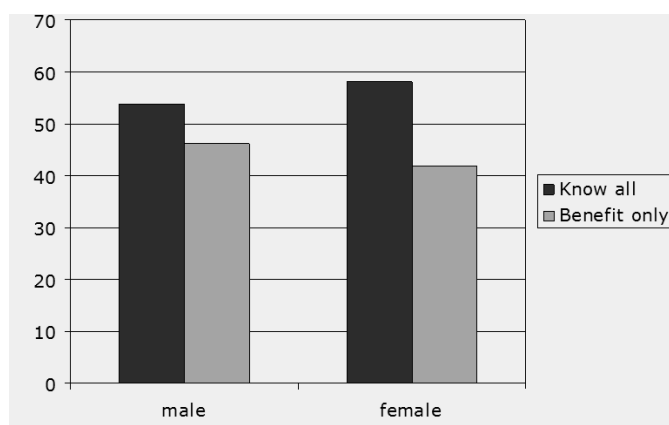


Figure 20 Gender effects of the preference for full information versus short claim

Source: Grunert (2007)

Svederberg

The study of Svederberg (2002) was based on the assumption that the individual's thinking and pattern of behavior concerning food is developed in relation to, and is the result of earlier formal and informal experiences and learning within his/her socio-cultural context. This context includes social, economic, ecological, regional and professional experiences. In the study respondents could give their opinion about the nutrition and health claims. She grouped respondents in 5 distinct groups of thinking:

ARE HEALTH CLAIMS UNDERSTOOD?

1. Based on their own and their family's health situation in the long term.
When confronted with nutrition claims and health claims on the food packages, the participants' attention was in the first place directed at facts that were of relevance in relation to questions on how to eat to live a healthy life in the long term.
2. Based on their own and the family's present health situation.
When confronted with statements on health-conducive characteristics of foods as expressed on the food packages, the attention of respondents was in the first place directed at facts of relevance in relation to present health problems.
3. Based on care for environmental issues locally and globally and care for their own health in relation to such issues.
The choice of food products was based on environmental considerations, as well as on considerations concerning their own health. Attention was directed at whether the food product was locally produced and on the list of ingredients.
4. Based on ambivalence between traditional eating habits and care for health.
Respondents were aware that their eating habits were not the best possible in relation to their understanding of nutritious food as a basis for good health and gave the impression of guilt when confronted with the claims
5. Based on a traditional view of eating habits, the taste of food that they are used to is emphasized.

9.2.2 Differences between countries

Van Trijp and Van der Lans found that there is a difference in understanding between different countries in the type terms that are understood and the type of claim. More people in Germany and the UK understand a health claim that did not mention the substance in it (probiotics): about 75% of respondents in the UK, Germany and Italy said they understood the health claim that it 'helps strengthen the body's natural defense system'. The structure function claim was less understood especially in Italy. The claim 'helps strengthen the body's natural defense system because it contains probiotics' was understood by 60% of respondents in Germany and the UK, and only 25% in Italy (Van Trijp & Van der Lans, 2007 as cited by Leathwood et al. 2007a).

Figure 21 taken from a presentation from Lähteenmäki about the ACCLAIM survey done in the Nordic states in 2007, shows that Icelanders perceive functional food with health claims as healthy, but Danes are very negative towards health claims probably because they do not consider that food as natural (Lähteenmäki, 2009).

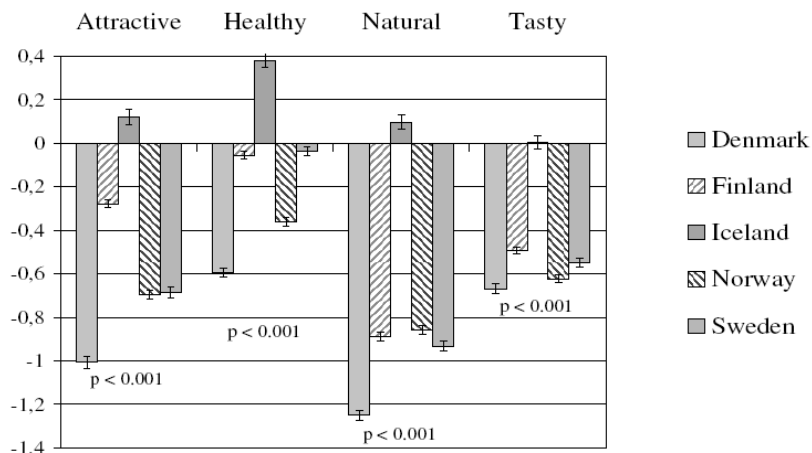


Figure 21 Differences between Nordic countries in evaluating functional food

Source: Lähteenmäki (2009)

9.2.3 Summarizing

Age seems a determinant factor in the positive perception of a claim and in the perception of who might benefit (Derby & Levy, 2005; Gyselaers, 2006). Education, gender and social class seem less important. According to Grunert (2007), there are 2 types of consumers: those who like a short claim that only gives the information that is relevant for him (this product is good for the heart) and the other type, consumers (mostly women) that want as much information as possible (what ingredient, long claim).

The influence of personal illness on perception of health claims is not very clear. Derby and Levy (2005) found that health status has inconsistent effects on the interpretation of health claims. The FSA (2002) is not sure that people with health issues understand claims better. It seems they are more familiar with the wording of the claims than healthy participants.

Besides gender, age, and health, cultural factors can play a role in the interpretation and understanding of health claims such as traditional eating habits (Svederberg, 2002). The country of origin seems to be of influence on whether the consumers interprets the functional food (with a health claim) as being healthy (Lähteenmäki, 2009).

9.3 Influence of knowledge, familiarity, carrier, terminology

9.3.1 Introduction

In a poster presentation, Leathwood et al. (2007b) summarize that consumers' interpretations are influenced by their pre-existing knowledge, beliefs and ideas, the food with which the claim is associated, the wording and context of the claim (packaging, endorsements) and the familiarity of the claim (Leathwood et al., 2007b).

This section of the chapter about influences on the perception and understanding of claims discusses the influence of knowledge (about the claim and its effects) (§ 9.3.2), familiarity (with the claim and/or the substance) (§ 9.3.2) and the positive health image of the carrier (i.e. the product with the claim) (§ 9.3.3).

9.3.2 Knowledge and Familiarity

FSANZ (2005a) stated in a report “Qualitative research on participants' perceptions and use of nutrition, health and related claims on packaged foods and associated advertising material” that existing knowledge about specific nutrients led to potential health benefits being better understood in content claims. A calcium content claim was recognized by participants as being a claim about content rather than health, but many participants nonetheless understood calcium was ‘good for bones’, while almost no health benefit was understood from the omega-6 fatty acids content claim because much less was known about it (FSANZ, 2005a).

Derby and Levy (2005) found differences between respondents with greater awareness of the health effects of a nutrient; they are more likely to react positively to an associated health claim (i.e., stronger ratings of scientific certainty, more positive ratings of the relevant health benefit and the importance of the food in the diet). Consumers will usually have prior beliefs about the strength of science underlying a given health claim before they see such a claim on a food product label. In the study of Derby & Levy they evaluated a so called ‘full information’ condition. Respondents in this condition saw a product label with a nutrient content claim after reading a one-page summary about the state of scientific evidence supporting the relevant health claim. Subjects in this condition represent “educated” consumers who have more knowledge about the science underlying the claim than an average consumer. Results showed that the ‘Full Information condition’ produced more scientific certainty about the substance/disease relation-

ship than simply seeing the health claim on a product label (especially when the scientific summary was mainly positive) (see Figure 22).

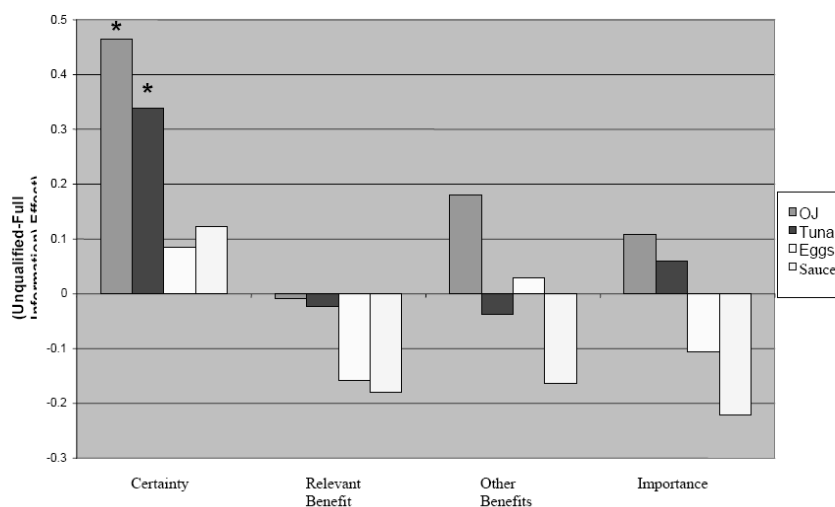


Figure 22 Communication Impacts of Full Information

The effect shown in Figure 22 is the value of ‘Unqualified Claim’ minus the value of ‘Full Information’. This effect is significantly higher for ‘scientific certainty about the claim’ in the case of Orange Juice (OJ) fortified with calcium and Tuna with Omega-3. Source: Derby & Levy (2005).

Knowledge about the substance responsible for the health effect mentioned in the claim also has an effect on the acceptance of functional food. Bech-Larsen and Grunert (2003) found that consumers accept the healthiness of foods enriched with oligosaccharides more than those enriched with Omega-3s, because more respondents knew about the physiological effects of Omega-3s (30%) compared to oligosaccharides (7%) (Bech-larsen and Grunert, 2003).

Familiarity

Five studies (Derby & Levy, 2005; France & Bone, 2005 as cited by EdComs, 2007, p.22; FDA, 2002 as cited by Hasler, 2008, Lin, 2007) found that consumers are so familiar with the health benefit of calcium and osteoporosis that the format presented has no influence on how strongly consumers believe in the stated benefit. A mere nutrition claim such as ‘contains calcium’ is enough for consumers to interpret and understand it as if it was a calcium/osteoporosis health claim. In the Acclaim survey in the Nordic countries of 2007 they found that knowledge and recognition of the health active ingredient are important: the acceptability of a claim was higher for omega-3 compared to the unfamiliar bioactive peptides (see Figure 23) (Lähteenmäki, 2009; Pedersen & Grunert, 2008).

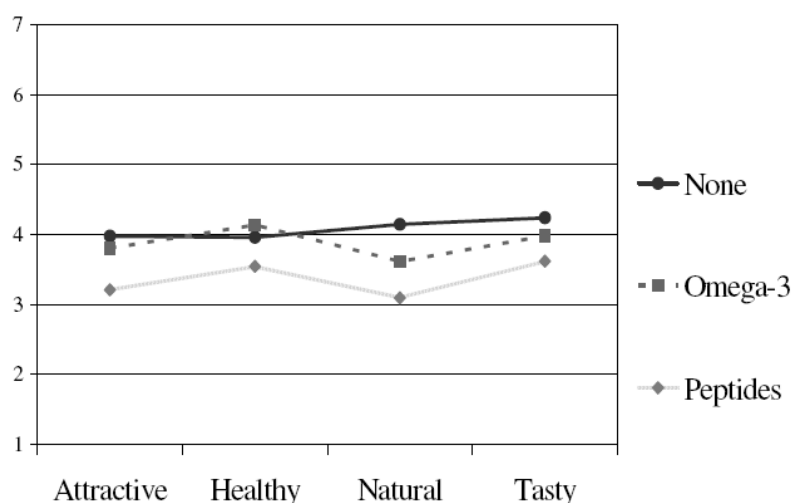


Figure 23 Familiarity important in the perception of claims.

Source: Lhteenmki (2008)

When a nutrient or diet-disease benefit is lesser known or unknown, respondents are more likely to believe the food has the stated benefit when they see a label with a health claim or a structure function claim than with a label with a nutrient content claim or with no health message (Lin, 2007). Derby & Levy (2005) showed that the positive impact of an unqualified health claim on perceived scientific certainty is strongest for the less familiar claims. They think the reason for this is that when a health claim is unfamiliar the consumer has less of a knowledge basis that can serve to trigger a critical response (Derby & Levy, 2005).

9.3.3 Positive health image of carrier

Three studies found that health claims are best appreciated when attached to a carrier (the product type that is used in combination with the claim) that has a positive ‘health image’ and health claim history (for instance yoghurt or margarine) instead of an ‘unhealthy’ carrier (e.g. chocolate) (Gyselaers, 2006, Van Kleef et al., 2005, Siegrist et al., 2008). A copy of the research of Van Kleef et al. (2005) in Australia, showed that health claims on tea, yoghurt, soup and brown bread had the highest ratings on intention to try, significantly different to those for ice-cream, chewing gum, margarine and meat replacer (Williams, 2008).

Bech-Larsen and Grunert (2003) examined attitudes relating to perceived healthiness of functional food across different cultures. They found that consumers perception of the healthiness of functional food is more dependent on their perception of the nutritional qualities of the base

product than on any type of health claim. Enriched spread was perceived positively and both the enriched juice and yoghurt were perceived negatively from the healthiness point of view. The explanation of the authors is that the juice and yoghurt are already healthy, but the spread could benefit from functional enrichment, because it is perceived as inherently unhealthy (Bech-Larsen & Grunert, 2003).

The results of Bech-Larsen and Grunert seem to contradict the results of Gyselaers, Van Kleef et al. & Siegrist et al., that health claims are more positively evaluated when used on a healthy product such as yoghurt than on an unhealthy product, but both results suggest that consumers do not perceive health claims independently from the carrier.

In a Belgium study among adolescents on schools, Adams and Geuens (2005) tried to find out whether the nature of the product (healthy versus unhealthy image) serves as a moderator in the reaction to health slogans used in food advertising. In this study a healthy slogan stresses the high nutritional value of the product and an unhealthy slogan draws attention to the sweetness of the product. They found that a healthy slogan only led to better responses in comparison to the unhealthy slogan if the product was also being perceived as healthy. In case of the unhealthy perceived product, the healthy slogan even generated lower scores than the unhealthy slogan (Adams & Geuens, 2005)

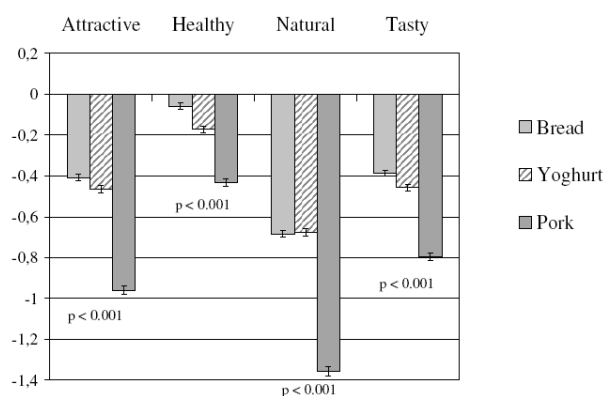


Figure 24 influence of product on perception of health claims

Source: Lahteenmaki (2009)

According to an unpublished ACCLAIM survey done in 2007, health claims are perceived more negatively in pork products than in bread or yoghurt (see Figure 24, Lahteenmaki, 2009). Health claims are not transferable across product categories: that consumers buy bread containing omega-3 does not infer that they will buy pork chops containing omega-3. On the contrary, the omega-3 pork chops were perceived as unnatural and the participants expressed concerns about the taste and health of the product (Pedersen & Grunert, 2008; Lahteenmaki, 2008).

FSANZ

In a qualitative research of FSANZ (2005a) the investigators remarked that the type of example products (e.g. milk, sunflower oil, tea, boost bars) used in the interviews to assess consumer perceptions of claims, also influenced how participants responded. Some found it difficult to separate their reactions to the example product and claim from their own views about that type of product or product category (FSANZ (2005a).

9.3.4 Summary

Knowledge about the claims influences consumer understanding of the claim, but also familiarity. The claim is not perceived independently from the product carrying the claim and it is also important what type of benefit is being claimed.

9.4 Terminology used in the claim

9.4.1 Introduction

It is likely that the way a claim is worded is an important factor in the way that the consumer understands a claim. We have seen in previous chapters that consumers find terminology used in some claims hard to understand, such as words describing the substance responsible for the effect such as ‘Omega-3’, or the illness that the food reduces the risk of such as ‘Spina Bifida’. Some words are used to enhance the certainty that the claim is true, such as ‘proven’, or qualify the claim such as ‘may’. The word ‘factor’ is used in a reduction of disease risk claim to show that not only the product is enough to minimize the risk of getting a disease. Do consumers interpret such qualifiers as intended? In §9.4.2 use of ‘may’ in a claim is discussed. In § 9.4.3 other qualifiers such as ‘helps’ are discussed. The FDA advises to use ‘model language’ for the qualified claims. In § 9.4.4 it alternatives for the FDA language is investigated.

9.4.2 Qualifier with ‘May’ or without ‘May’

Kapsak et al.

Kapsak et al. (2008) found in the interview phase of their study, that particular words such as "promising" or "inconclusive" were perceived to mean different things to different consumers. For example, some consumers felt that "promising" implied "positive" and "hopeful," while others felt this type of language was very "flowery" and implied "marketing trickery." "Inconclusive" implied to some consumers "honesty" and "believability," while others felt the presence of this word implied extreme negativity. For others, simply having the word "may" was enough of a "qualifier" to make it appear that the claim was not the subject of SSA.

In the survey phase of the study of Kapsak et al. (2008), they found that consumer perception of scientific evidence does not differ by the use of the qualifying 'may'. Consumers do not perceive any difference between claims that contain “may,” and those that do not contain “may,” with respect to the scientific evidence associated with either claim (see Figure 25).

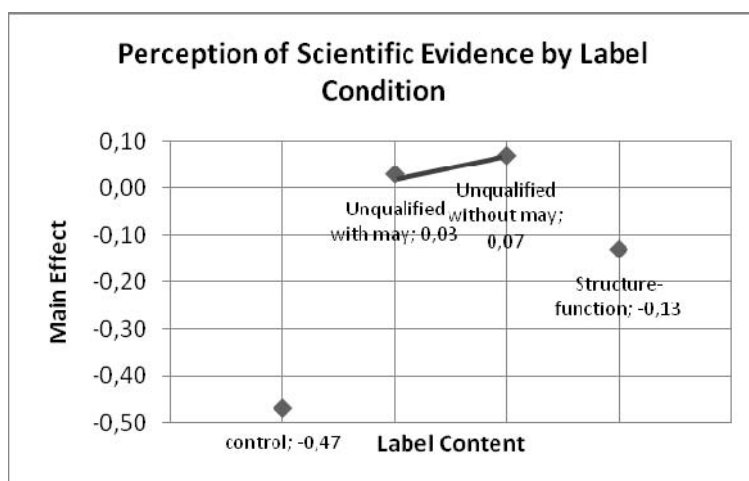


Figure 25 Perception of Scientific Evidence by Label Condition

Derby & Levy

Expressing the substance/disease relationship without “may” leads to significantly lower ratings of the perceived importance of the product to a healthy diet, an indication of an unexpected negative effect for health claims.

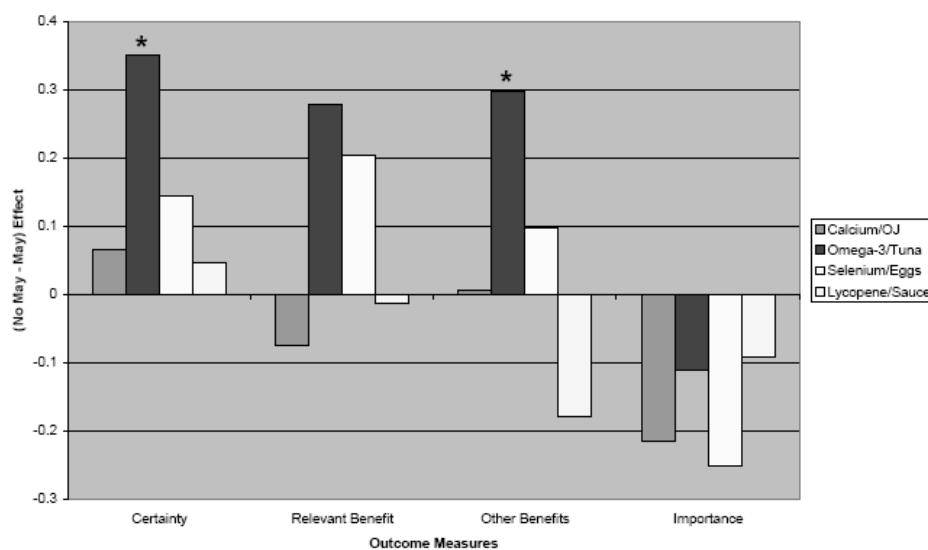


Figure 26 Omitting "may" from Statement of Health Claim.

Source: Derby & Levy, p. 28 (2005)

As Figure 26 shows, the effects of the outcomes of the ‘no may’ condition minus the ‘may condition’ are mixed. For the perception of ‘scientific certainty’, ‘relevant health benefit’ and ‘other health benefits’ the effect was not significant, but for ‘perceived importance of food as part of a healthy diet’ the effect was significant. The Omega-3/Tuna pairing is the only one of the four claim/product pairings that shows some positive effects of omitting “may” from the statement of the health claim (significant in certainty and other benefits) (Derby & Levy, 2005).

FSANZ

In a report on health claims for FSANZ (2005a) the use or absence of the word ‘may’ in the claim (eg calcium may assist in ...’) caused a mixed response:

- no use of word ‘may’: less *doubt* and uncertainty about the claim; or less *trust* in a global statement about benefits.
- use of the word ‘may’: *reduction* in confidence in the claim due to lack of certainty; or *enhanced* confidence in the claim because it was realistic and not making a global claim about benefits (FSANZ, 2005a)

FSA

The research of the FSA in the United Kingdom (2002), looked into language issues and investigated the effects of the words ‘may’, ‘helps’, ‘can’ and ‘as part of a healthy diet’ in the claim. Their conclusions were that these qualifiers were very influential in interpretation of claims, but in different ways and to different degrees.

- ‘May’ as a qualification of a claim.
 - “May’ is widely viewed with suspicion, commonly taken to indicate manufacturer’s lack of confidence or evidence that the product will deliver in an attempt to ‘cover their backs’ / avoid any possibility of being sued.
 - “It means they don’t know themselves if it does what it says or not.”*
 - However, ‘may’ is preferred by small minority as more realistic, honest or believable and less likely to mislead or create false hopes (FSA, 2002)

9.4.3 Other qualifiers such as 'Can' and 'Helps'

FSA

In the study of the FSA in 2002 they also asked about other words used in claims.

- 'Can' and Helps'.

For some these terms as qualifications of claims were treated with reservation although perceived as different from 'may' in degree of uncertainty

- 'Can', whilst 'indecisive', viewed as more definite than 'may'
- 'Helps' suggests that, whilst product is not effective on its own, it may be effective in conjunction with other things (e.g. healthy diet / lifestyle)
- For others, both 'can' and 'helps' communicate in a more positive way:
 - 'Can' taken to mean 'able to' and, therefore, will (e.g. bring down your cholesterol)
 - 'Helps' taken to mean 'does help' / contributes positively / makes a difference

- Risk' vs. 'Risk factor'

Very mixed and often confused views on question whether 'risk' or 'risk factor' mean the same or something different.

- 'As part of a healthy diet'

Some respondents felt this phrase was material to the claim as a warning: the product will only deliver in context of other factors, will not work on its own, or as a marker to identify a healthy product. Others tended to ignore as irrelevant (FSA, 2002).

Svederberg

In the study of Svederberg (2002) she noted that participants were critical to the expression "research shows" due to a general lack of confidence in what researchers say and to the expression "can contribute", mainly due to the impression of uncertainty in the vague formulation (Svederberg, 2002).

9.4.4 Alternative language for text-only claims

Ternus et al.

In 2003, the US Food and Drug Administration (FDA) began authorizing qualified health claims for conventional foods. Although the FDA had developed generic qualifying language for these claims, the language had not yet been tested with consumers. Ternus et al. (2006) conducted shopping mall intercept research among a random sample of 408 adults. The research tested consumer preference, understanding and believability and impact on nut consumption of 4 variations of the 'B' level qualified health claim for nuts and heart disease. The FDA generic language was used as the control (see Table 12).

FDA generic claim (Control)	
	"Nuts [including name of specific nut] , as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. FDA evaluated the data and determined that, although there is scientific evidence supporting the claim, the evidence is not conclusive. "
Alternatives	
Alternative 1: "Uncertainty remains"	
	"Nuts may reduce the risk of heart disease when eaten as part of a diet low in saturated fat and cholesterol. FDA has determined that although some scientific uncertainty remains, the weight of the evidence supports this conclusion."
Alternative 2: "Data limited"	
	"Eating nuts regularly as part of a diet low in saturated fat and cholesterol may reduce your risk of heart disease. FDA has concluded that while the scientific data are limited, that majority of available evidence supports this statement."
Alternative 3: "Evidence suggests"	
	"New scientific evidence suggests, but does not yet prove that eating nuts may help reduce your risk of heart disease when eaten as part of a diet low in saturated fat and cholesterol"
Alternative 4: "Emerging Evidence"	
	"The weight of emerging scientific evidence suggests that nuts may reduce the risk of heart disease as part of a diet low in saturated fat and cholesterol"

Table 12 FDA control claim and four alternatives

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	FDA Generic (N=408)	Uncertainty Remains (n=208)	Data Limited (n=208)	Evidence Suggests (N=203)	Emerging Evidence (n=197)
Clarity/understandability of statement					
Extremely/very clear and easy to understand (top 2 ratings)	86	87	91*	94*	87
Extremely clear and easy to understand (top rating only)	34	42*	40	44*	45*
Believability of Statement					
Extremely/very believable (top 2 ratings)	81	82	78	79	78
Extremely believable (top rating only)	21	24	22	20	21
Believability in linking eating nuts to reducing heart disease risk					
Extremely/very believable (top 2 ratings)	66	74*	79*	68	69
Extremely believable (top rating only)	21	28*	31*	24	22
How sure authors are that nuts help reduce heart disease risk					
Completely/very sure (top 2 ratings)	54	65*	65*	50	64*
Completely sure(top rating only)	18	26*	27*	18	23
Likelihood to buy/eat more nuts based on statement					
Much/somewhat more likely (top 2 ratings)	58	61	71*	58	61
Much more likely (top rating only)	26	31	38*	30	26
*Significantly higher than the FDA generic claim (P<90). A standard 2-tailed t test was used to analyze rating responses. Each scale used a rating of 1 to 5, with 1 being "not at all" and 5 being "extremely"					

Table 13 Consumer Ratings of Tested Qualified Health Claims

Source: Ternus, 2006

Table 13 shows the percentage of respondents who rated the claims with the highest rating ('5' on the 5-point scale) and with the top 2 ratings ('4' or '5' on this scale). All of the claims received high scores on believability. The alternative claims entitled 'Uncertainty Remains' and 'Data Limited' received significantly higher scores for believability that nuts reduce the risk of heart disease compared with the other tested claims. The 'Data Limited' qualifying language was also ranked significantly higher (38%, 'much more likely to buy/eat more nuts') than all other claims with respect to increased purchase intent. The 'Evidence Suggests' qualifying language was ranked significantly higher FDA's generic language for clarity/understandability but was similar in all other categories, including the scientific uncertainty associated with the claim that nuts

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reduce the risk of heart disease. The FDA has agreed that the following (category B qualified health claim) can be used: “Scientific evidence suggests but does not prove that eating 1.5 ounces per day of most nuts as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease”. Ternus et al. conclude that it is possible to meet FDA's standards for truthful and not misleading health claims using consumer-friendly language (Ternus et al., 2006)

Kapsak

Not elaborated on in the article, but discussed in a public meeting of the FDA by Kapsak (2005), the research also examined alternative language to the FDA ‘model language’ (the standard sentences to describe a health claim). They used alternative language for a level B, C and D claim (see Table 14).

Level B claim	
Alternative 1	New scientific evidence suggests, but does not prove, that [component] may reduce the risk of [disease]. (e.g. “New scientific evidence suggests, but does not prove, that calcium may reduce the risk of osteoporosis”)
Alternative 2	A growing body of scientific evidence suggests that [Component] may reduce the risk of [disease]. (e.g. “A growing body of scientific evidence suggests that calcium may reduce the risk of osteoporosis”)
Level C claim	Limited preliminary studies suggest, but does not prove, that [component] may reduce the risk of [disease].(e.g. “Emerging yet inconclusive evidence suggests that the antioxidant lycopene may reduce the risk of certain cancers, including prostate cancer in men”)
Level D claim	Emerging yet inconclusive evidence suggests that [component] may reduce the risk of [disease]. FDA concludes there is little evidence supporting this claim (e.g. “Emerging yet inconclusive evidence suggests that trilinium may reduce the risk of diabetes”) .

Table 14 Alternative language used by Kapsak (2005)

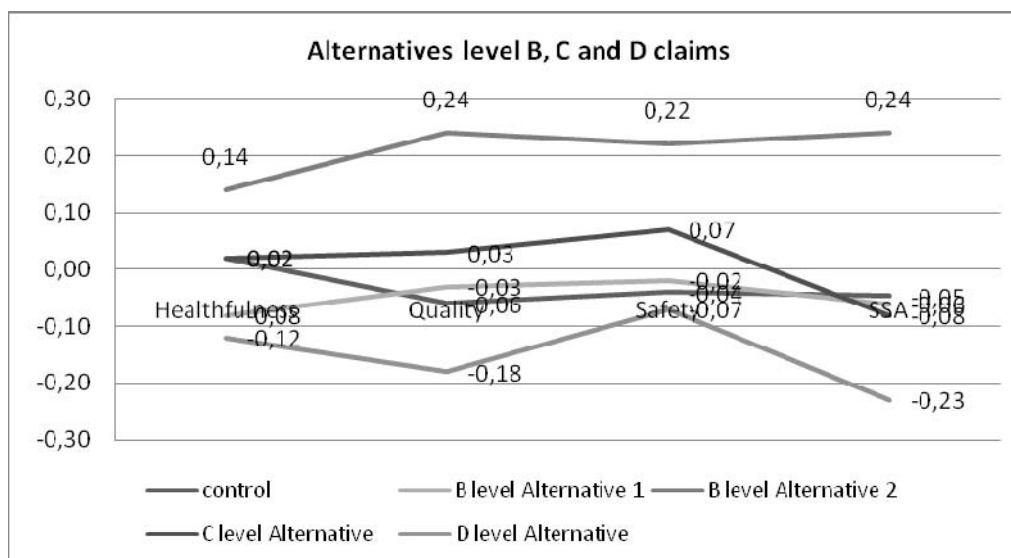


Figure 27 Alternative language for B, C and D level claim

The second Alternative for a level B claim (top line in Figure 27) scored significantly higher in perception of healthfulness, quality and safety than the control condition. The alternatives for level C and D did not. Figure 28 shows that Alternative 2 for the level B claim (top line) also scored higher than the Point-Counterpoint text claim or the Embedded text claim (Kapsak, 2005).

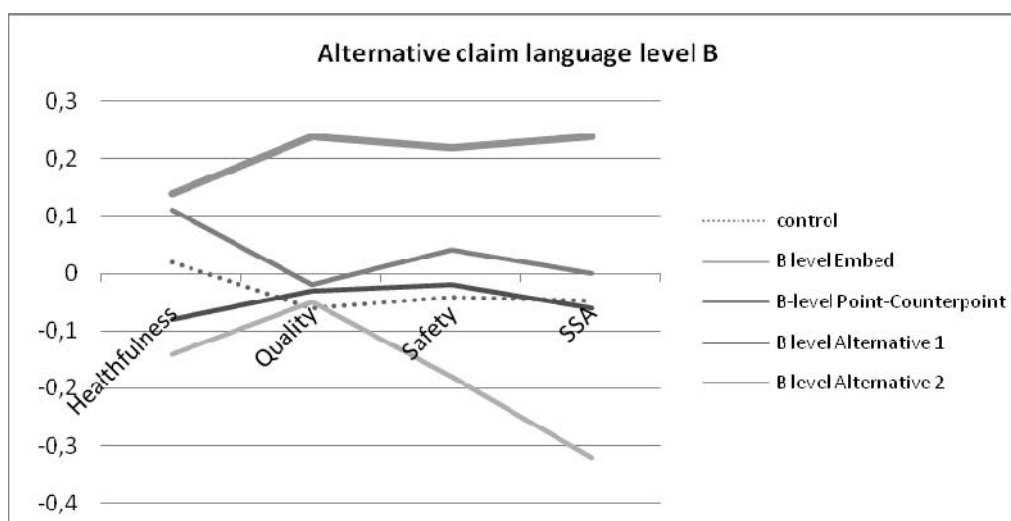


Figure 28 B level alternative language 2 compared to Point-Counterpoint and Embedded

9.4.5 Positive / negative framing

A claim can be framed in a positive way – achieving something positively (“Increases the likelihood of a good memory”), or in a negative way – avoiding something (e.g. an illness) (“Delays decreasing memory function”). In the Nordic study Grunert found that consumers like the positive phrasing more (Grunert, 2007).

9.4.6 Summary

There are mixed reactions to qualifying language. Some consumers like the honesty of it, others found it confusing. A slight deviation from the FDA standard phrasing was found to be clearer and better understood by consumers and still make clear the scientific uncertainty associated with the claim (Ternus et al., 2006; Kapsak, 2005). Ternus found that the 'Evidence Suggests' qualifying language was found to be clearer and better understood by consumers than the FDA ‘model language’ and still make clear the scientific uncertainty associated with the claim. Kapsak found that an alternative to a standard level B claim e.g. “A growing body of scientific evidence suggests that [Component] may reduce the risk of [disease]”, scored significantly higher in perception of healthfulness, quality and safety than the control condition.

9.5 Conclusion Chapter 9

The studies showed that there are connections between several variables and consumer understanding of health claims, such as sociodemographic factors, knowledge about the claim or the substance in the claim, familiarity with the product and the claim and the terminology used in the claim. Consumers do not perceive the health claim independently from the carrier or the benefit stated in the claim. Understanding of a claim or the substance mentioned in a claim can be different depending on country of origin (Van Trijp & Van der Lans, 2005). Personal interest or cultural influences (taste, religion, interest in the environment) can differentiate consumers in their perception of health and nutrition claims (Svederberg, 2002; Grunert, 2007; Lähteenmäki, 2008).

Chapter 10 Conclusions and Discussion

10.1 Conclusions

Do consumers understand the health claims and can they make a distinction between different types of claims? That is the central question that is investigated here. This report reviews literature on consumer understanding of health claims and focuses mainly on the situation in Europe and the United States. Thirty seven articles were read that gave an answer to the central question and/or the partial questions.

1. *Do consumers see the difference between Scientifically Substantiated Health Claims and those of which evidence is probable, possible or insufficient?*

Consumers cannot distinguish between health claims that are scientifically substantiated and claims for which the evidence is probable, possible or insufficient. Consumers are not able to distinguish between the four levels of health claims with the disclaimer language that attempts to explain the strength of science upon which the claim is based (Teratanavat et al. 2004; Derby & Levy 2005; Hooker & Teratanavat 2008; Murphy 2005; Kapsak et al., 2008).

2. *What influence does the visual form have on understanding the difference between the four levels of health claims?*

Consumers do not understand the difference between the levels of scientific evidence for a health claim when expressed in words, but a report card graphic aid does help to convey the right amount of SSA. Only when a visual aid (FDA graphic/report card) was used were consumers able make a correct distinction between the four levels of claims. With the FDA graphic consumers can be better informed about the science supporting the claim (Derby & Levy 2005; Hooker & Teratanavat 2008; Kapsak et al., 2008).

3. *Can consumers differentiate between Nutrition Claims and Health Claims?*

There is a trend that consumers can see the difference between both claims, but more research is needed. Health claims give more understanding of a relationship between the product and a health condition (FSANZ, 2005) According to one study consumers understand a nutrition claim better than a health claim (FSANZ, 2003), but two other studies claim that a health claim is better understood (Derby & Levy, 2005; AFIC, 2006). How well a claim is understood depends also on the benefit that is claimed. A health claim is better understood in combination with benefits such as cardiovascular disease, but when the benefits concern body weight or concentration, the nutrition claim is easier to understand (Van Trijp & Van der Lans). The perception of scientific evidence is higher in health claims than in nu-

trition content claims (Kapsak et al., 2008). According a study in Belgium, consumers do not distinguish between nutrition and health claims (Vandercammen, 2003).

4. *Do consumers understand the nutrient content claim?* No, consumers need more help in understanding nutrition claims. Consumers do not understand the cut-off points frequently used in the nutrient content claims like 'high', 'a good source' or 'light'. (Byrd-Bredbenner 2000; FSANZ 2003a; Chan et al., 2005). Consumers found many terms (such as trans fat) used in nutrition claims difficult to understand (FSANZ 2003b; Vandercammen, 2005). When the terms in nutrition claims and the risks or benefits of the substances in the products are not well understood, the claims are also not well understood.
5. *Can consumers differentiate between Function Claims and Reduction of Disease risk claims?* The answer is maybe. Not enough research is done, especially in Europe, to be able to answer the question. Consumers do make a distinction between the types of claim, but not on the right premises (FSA, 2002). Function claims and reduction of disease risk claims have a positive influence on consumers' perception of the healthiness of foods (Bech-Larsen & Grunert, 2003). Consumers cannot see the difference in scientific support between the unqualified health claims and the structure function claims (Kapsak et al., 2008). Food professionals can recognize which claims are approved or unapproved, but they have difficulty with the structure-function claims (Camire & Dougherty 2005).
6. *Do consumers understand the health claim if it is presented with a front of the pack logo?* A front of the pack logo is a useful tool for consumers to make a fast choice between similar products during hectic shopping. Consumers that like to be more informed a more complete information can be put on the back of the pack label. For the front of the pack the simplest form of logos like a healthier choice tick is better because difficult symbols take time to read (Feunekes et al., 2008) . Results can be measured as seen from the reduction in the use of salt in products carrying the tick (Young & Swinburg, 2002; Williams McMahon & Boustead, 2003).
7. *Do consumers interpret claims as they are intended or do they make biased inferences?* Consumers do not always interpret claims as they are intended. Ranking and language has an effect on consumer perceptions on the overall product safety, quality and healthiness. Biased inferences such as the 'positive bias' (FSANZ, 2005b ; Lin, 2007), 'boomerang effect' (Derby & Levy, 2005; Murphy et al., 2007), 'interactive effect' (Williams, 2005) and the 'halo effect' (Wansink & Chandon, 2007; Williams, 2005; Kapsak et al., 2008, Murphy et al., 2007) have been demonstrated..

8. *Is the perception, interpretation and understanding of health and nutrition claims influenced by other factors than knowledge, such as demographics variables, health status, cultural differences or other variables?* Many variables influence consumer understanding of health claims, such as socio-demographic factors, knowledge about the claim or the substance in the claim, familiarity with the product and the claim and the terminology used in the claim. Consumers do not perceive the health claim independently from the carrier or the benefit stated in the claim. Understanding a claim or the substance mentioned in a claim can be different depending on country of origin (Van Trijp & Van der Lans, 2005). The perception of health and nutrition can be influenced by personal interest or cultural factors (taste, religion, eating organic food) (Svederberg, 2002; Grunert, 2007; Lähteenmäki, 2008).

The conclusion of this review is that consumers do not fully understand health claims nor do they understand the differences between types of health claims. Consumers draw their own conclusions based on various types of premises, inferences and influences. To aid the consumer a short claim or front-of-pack symbol, with more back-of-the pack information explaining the substance and the benefit mentioned in the health claim is recommended. For showing the amount of evidence for the claim the visual 'report card' graphic can be used.

10.2 Discussion

Consumers do not have to understand the science behind the claims but consumers should be able to "understand the beneficial effects as expressed in the claim". If difficult terms are not explained on the package, it requires previous knowledge of the consumer about the substance or the health benefit mentioned in the claim. From the studies it appears that some of the necessary knowledge is lacking.

Nutrition claims say something about the value of the nutrient per 100 gram product in some countries and per serving in other countries. Consumers need to know if the amount in the consumed product is enough to give the claimed effect. Professionals in the food industry found it already quite difficult to calculate what amount of a nutrient the product contained (Camire & Dougherty, 2005).

Health claims in the United States are rated into four levels that represent the amount of scientific support for the claim. Consumers perception of the products health benefits should correspond to the level of scientific support. Studies have been done to see if the claim language

or a visual aid make it clear if the claim is substantiated or that the evidence is probable, possible or insufficient. It was found that consumers only can make the correct distinction when using the visual aid. But do consumers understand what scientific substantiation of a claim actually means? It takes at least eight pages to explain the process of scientific substantiation of health claims in Europe as shown in an article from Richardson, Binns and Viner (2007). To my knowledge no studies have been done to see if consumers know what 'scientific evidence' means. Therefore an important question is: do the studies that investigate the effects of strength of science disclaimers on the communication impacts of health claims actually measure what they intend?

It takes many experts to assess and determine the scientific support for a claim. Even when the claim is proven, the beneficial effects might be only applicable for a part of the population. The label should give information about the amount that should be used to get the beneficial effect, for whom the claim is intended and warnings who should not use it. As a consequence, besides the disclaimers that show the amount of scientific support for the claim, the claims also give other information such as ".....as part of a diet low in saturated fat and cholesterol" and qualifying language such as 'may reduce...' or 'is a factor in...'. Consumers are not scientists though and don't understand these details (Kapsak et al., 2008, FSA, 2002). The 'model language' that FDA advises to use for the claim does not make the claim more understandable for the consumer, or make the level of the scientific evidence more clear (Ternus, 2006; Kapsak, 2005).

Consumers only have limited shopping time in the supermarket to make their choice. Therefore short understandable claims that are endorsed by a trustworthy institution are better than trying to make the claim 'fit' the exact amount of evidence. Full information is interesting for some consumers (Svederberg, 2002) and can be put on the back of the pack or in a separate leaflet, while a simple front of the pack-logo or an easy short and positive framed claim could be used on the front of the pack.

There might be drawbacks to front of the pack-logo's that have not been discussed in the literature such as:

- Different symbols use different cut-off points for nutrition content claims such as 'low in fat'.

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- Some symbols use the word 'healthy' ('healthier choice'), but what does 'healthy' mean? The FDA (2008b) requires that the food with the term "healthy" and related terms (an implied claim) is low in fat, saturated fat, sodium and cholesterol and has a minimum amount of beneficial nutrients.
- If front of the pack symbols are used, it should be clear that the product is more healthy in comparison to similar products and only when eaten in moderate amounts as part of an overall healthy diet.
- How can the consumer find out what the symbol means? Even advertisements in the media are often unclear about the exact meaning of the symbol.
- When symbols are commercial how can a consumer rely on the truthfulness of such a symbol? An endorsement of a reliable nutritional source seems prudent.

Consumers might understand the claim, but still not act on it in the sense that they buy the more healthy product. Marketing is interested in the way the label catches the interest of the consumer for the purpose that he or she will purchase the product. But when investigating consumer understanding of claims for scientific purposes or for making health policies, one is more interested in the actual comprehension of the information. Consumer understanding is influenced by numerous factors. Some of those factors are presented in Figure 29.

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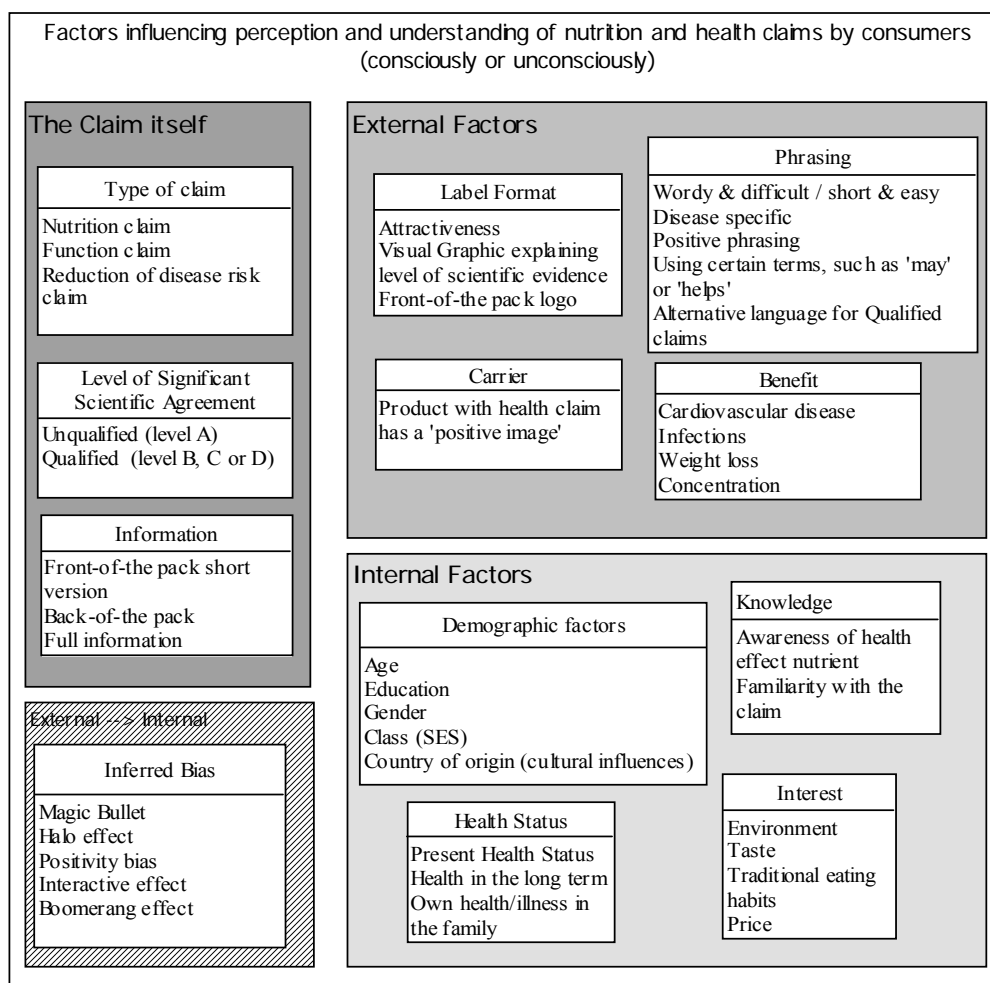


Figure 29 Influencing factors on consumer understanding of health claims

Consumer perception of claims is divided in that of the content of the claim itself and the way the claim is presented. Internal factors of the consumer itself are an influence as well.

Figure 29 shows that processing of the claim is (consciously, or unconsciously) influenced by the information in the claim itself and factors that have nothing to do with the claim (such as the attractiveness of the label). Besides the claim itself, internal factors of the consumer such as socio-demographic factors (age, education, health status), personal factors (such as interest) and external factors from the label (format, carrier) are of influence of the perception of the claim. To get a good insight in all the influences that play a role in the understanding of claims, they have to be measured and/or asked for in the interview, which leads to the prospect of continuing research in this field.

10.3 Suggestions for more research

When the EFSA finishes the reviewing of permitted claims under article 13 and 14, it would be sensible to test consumer understanding of those claims. When that happens the proposed step by step method of Leathwood et al. (2007a, 2007b) could be used to assess consumer understanding of health claims. I would like to suggest some small adaptations as indicated here in italics and further elaborated on in the subsequent paragraphs.

1. *Independent scientific research (see § 10.3.1)*
2. Identify the consumers to be recruited - Define target group and characteristics.
 - *Demographic differences, cultural backgrounds, personal interests, history of health problems*
 - *Intended consumer (see § 10.3.2). Does the claim only apply for part of the population?*
3. Define the food–claim–presentation combination to be tested
 - *Claim format (text, visual presentations, logo's), terminology, with or without mentioning the substance responsible for the claim*
 - *Carrier: more than one product has to be tested, and also products with a less healthy image (e.g. chocolate)*
4. *Choose research type (see § 10.3.3).*
 - *Shopping basket / real-world setting instead of a questionnaire.*
5. Identify the range of consumer interpretations of the claim (qualitative research)
 - *Do consumers understand the beneficial effects as expressed in the claim? Do they understand the terms used in the claim?*
 - *Heuristic approach (see § 10.3.4)*
6. Quantify the accuracy of consumers' understanding of the claim (quantitative research)
 - *How many of the respondents can outline the beneficial effects in their own words?*

10.3.1 Independent scientific research

The subject of health claims is narrowly intertwined with marketing. Product labels can be used for information that is beneficial for the consumer, but also for advertisement. Some of the studies have been performed with the interest of marketing as background. In those cases questions such as 'which claims are better liked by consumers' have been investigated and not if consumers really understand the claim. Future research on consumer understanding of health

claims should be independent of any influence of manufacturers. Preferably done with identical statistical methods, so results can be analyzed from multiple studies.

10.3.2 Intended consumer

*A claim should reflect its scientific basis and, at the same time, should be understandable, and not be misleading for the **intended** consumer (Aggett, 2005)*

The stated health benefit in a claim may apply only for part of the population. A variety of factors in lifestyle (smoking, exercise) and eating habits can influence the long term results. Do consumers understand the small print that explains for whom the claim applies, and the conditions stated in the claim (eg “as part of a diet low in saturated fat and cholesterol”)?

Not only understanding the content of the claim is important for consumers, but also understanding the relevance for oneself (Lähteenmäki, 2009)

A health claim can help consumers to follow the diet advice from their doctors. Not all patients get the same advice though. In the case of the most prevalent nutrition-related health concerns (CVD and diabetes), CVD patients are often instructed to minimize their saturated and trans fat intake and to limit sodium intake while diabetics are often instructed to reduce their sugar intake but increase fiber (Basil et al., 2008).

The right product should be used for each patient. Possible future research should see if the health and/or nutrition claim reaches the intended consumer.

10.3.3 Influence of research type

Possible future research has to take in account the results of Feunekes et al. (2008), namely that the way the research was conducted, influenced the results of the study. Feunekes et al. evaluated the effectiveness of different nutrition labeling formats (front-of-pack symbols) in an experimental setting (where participants have time to process all the information) and compared it to a shopping situation where nutrition labels have to compete with many other stimuli. They introduced the ‘shopping basket’ to better mimic a shopping context and used this next to a method called ‘product pair’, in which they compared two types of products. The results of their study suggest that the way a format is tested impacts on how participants judge products with the different formats. For example, the formats were slightly more liked when tested with the ‘shopping basket’ method than when tested with the ‘product pair’ method (Feunekes et al.,

2008). When trying to look at consumer behavior in real-world setting a new method called Eyetracking could be used (see Figure 30). Rawson, Janes and Jordan (2008) started with this method in the UK to investigate consumer labeling. In combination with playback and questions, understanding of health claims can be investigated thoroughly. Eyetracking is however a very time-consuming and expensive way of research (Rawson, Janes & Jordan, 2008).



Figure 30 Eyetracking

10.3.4 Heuristic approach

Many factors interfere with the interpretation of the claim, such as the halo and magic bullet effect and demographic factors. What is the reason behind these factors? How is it possible that in some cases a stronger worded claim about the science supporting it, causes negative effects on product perceptions? The field of psychology may shed more light on the thought processes of consumers. A heuristic approach focuses on the psychological mechanisms by which consumers process information concerning health claims. In psychology, heuristics are simple rules, which have been proposed to explain how people make decisions, come to judgments, and solve problems, typically when facing complex problems or incomplete information. These rules work well under most circumstances, but in certain cases lead to systematic errors or cognitive biases.

The heuristic approach could be done in phase 3 of the step-by-step plan instead of the qualitative research.

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Appendix A Authorized Health Claims

Calcium and osteoporosis: “Regular exercise and a healthy diet with enough calcium helps teens and young adult white and Asian women maintain good bone health and may reduce their high risk of osteoporosis later in life.”

Sodium and hypertension: “Diets low in sodium may reduce the risk of high blood pressure, a disease associated with many factors.”

Dietary fat and cancer: “Development of cancer depends on many factors. A diet low in total fat may reduce the risk of some cancers.” (Since this claim was approved, the major Women’s Health Initiative Dietary Modification Trial failed to find an association between reducing total fat and cancer risk).

Dietary saturated fat and cholesterol and risk of coronary heart disease: “While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease.”

Fiber-containing grain products, fruits and vegetables and cancer: “Low-fat diets rich in fiber-containing grain products, fruits and vegetables may reduce the risk of some types of cancer, a disease associated with many factors.”

Fruits, vegetables and grain products that contain fiber, particularly soluble fiber, and risk of coronary heart disease: “Diets low in saturated fat and cholesterol and rich in fruits, vegetables and grain products that contain some types of dietary fiber, particularly soluble fiber, may reduce the risk of heart disease, a disease associated with many factors.”

Fruits and vegetables and cancer: “Low-fat diets rich in fruits and vegetables (foods that are low in fat and may contain dietary fiber, Vitamin A or Vitamin C) may reduce the risk of some types of cancer, a disease associated with many factors.”

Folate and neural-tube defects (spina bifida): “Healthful diets with adequate folate may reduce a woman’s risk of having a child with a brain or spinal cord defect.”

Dietary sugar alcohol and dental caries: “Frequent between meal consumption of foods high in sugars and starches promotes tooth decay. The sugar alcohols in [name of food] do not promote tooth decay.”

Soluble fiber from certain foods and risk of coronary heart disease: “Soluble fiber from foods such as [name of soluble fiber source, and, if desired, name of food product], as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease. A serving of [name of food product] supplies ___ grams of the [necessary daily dietary intake for the benefit] soluble fiber from [name of soluble fiber source] necessary per day to have this effect.”

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Soy protein and risk of coronary heart disease: “Five grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease.”

Plant sterol/stanol esters and risk of coronary heart disease: “Foods containing at least 0,65 gram per serving of vegetable oil sterol esters, eaten twice a day with meals for a daily total intake of at least 1.3 grams, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease.”

Appendix B Nutrition Claims

The descriptions of the European legislation and the United States FDA regulations about ‘nutrition claims’ or ‘nutrient content claims’ seem very similar. But the ‘cut-off points’ (criteria) for the values sometimes differ.

Take for example the claim “Low Fat”:

- For EU Member States these content claims are now defined by the annex to the nutrition and health claims regulation. The conditions applying to the nutrition claim “Low fat” is ‘Product contains no more than 3 g of fat per 100 g for solids or 1.5 g of fat per 100 ml for liquids (1.8 g of fat per 100 ml for semi-skimmed milk)’ (European Food Information Resource Network (Eurofir), n.d.).
- In the United states FDA's rules spell out what terms may be used to describe the level of a nutrient in a food and how they can be used: low-fat stands for 3 g or less per serving (FDA, 2008a).

‘Per serving’ is much harder to understand for consumers. When the label on a large packet of chips (500g) states that the consumer eats 9% of the daily recommended fat per serving and the serving size is 25 grams, then the consumer must be very well informed to realize he is eating 180% of the daily recommended fat when eating the whole bag of chips.

In Table 15 a comparison is made between the nutrition claims that are defined under the same name in the Annex of the EU Regulation 1924/2006 on nutrition and health claims and the FDA Nutrition Content Claims.

In Table 16 those that are only defined in the Annex of Regulation 1924/2006 are described (Regulation, 2006) and in Table 17 nutrition claims that are only described in the FDA are summed up (Hunter & Cason, 2006)

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Annex of EU Regulation 1924/2006		FDA Nutrition Content Claims
Low-fat	No more than 3 g of fat per 100 g for solids or 1,5 g of fat per 100ml for liquids (1,8 g of fat per 100 ml for semi-skimmed milk).	3 g or less per serving
Fat-free/ skim (in milk)	No more than 0,5 g of fat per 100 g or 100 ml. However, claims expressed as "X % fat-free" shall be prohibited.	less than 0,5 g per serving
Low-saturated fat	The sum of saturated fatty acids and trans-fatty acids in the product does not exceed 1,5 g per 100 g for solids or 0,75 g/100 ml for liquids and in either case the sum of saturated fatty acids and trans-fatty acids must not provide more than 10 % of energy.	1 g or less per serving
Saturated fat free	The sum of saturated fat and trans-fatty acids does not exceed 0,1 g of saturated fat per 100 g or 100 ml.	Less than 0,5 gram saturated fat and less than 0,5 gram trans fatty acids
Sugar-free	No more than 0,5 g of sugar per 100 g or 100 ml.	less than 0,5 g per serving.
Low-sodium / salt	No more than 0,12 g of sodium, or the equivalent value for salt, per 100 g or per 100 ml. For waters, other than natural mineral waters falling within the scope of Directive 80/777/EEC, this value should not exceed 2 mg of sodium per 100 ml.	140 mg or less per serving
Very low sodium / salt	No more than 0,04 g of sodium, or the equivalent value for salt, per 100 g or per 100 ml. This claim shall not be used for natural mineral waters and other waters.	35 mg or less per serving
Sodium-free or salt-free	No more than 0,005 g of sodium, or the equivalent value for salt, per 100 g.	Less than 5 milligrams sodium

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	Annex of EU Regulation 1924/2006	FDA Nutrition Content Claims
Source of fiber/ Good source of fiber	At least 3 g of fibre per 100 g or at least 1,5 g of fibre per 100 kcal.	2.5 grams to 4.9 grams
High fiber	At least 6 g of fibre per 100 g or at least 3 g of fibre per 100 kcal.	5 grams or more per serving (If food is not low in total fat, the label must state total fat in conjunction with the fiber claims)
High (name of vitamin/s and/or name of mineral/s)	At least twice the value of "source of (name of vitamins/s and/or name of mineral/s)".	if the food contains 20 percent or more of the Daily Value for a particular nutrient in a serving
Light / Lite	Same conditions as those set for the term "reduced"; the claim shall also be accompanied by an indication of the characteristic(s) which make(s) the food "light" or "lite".	a nutritionally altered product contains one-third fewer calories or half the fat of the reference food. If the food derives 50 percent or more of its calories from fat, the reduction must be 50 percent of the fat.
		the sodium content of a low-calorie, low-fat food has been reduced by 50 percent
Reduced (name of the nutrient)	The reduction in content is at least 30% compared to a similar product, except for micronutrients where a 10% difference in the reference values as set in Council Directive 90/496/EEC shall be acceptable and for sodium, or the equivalent value for salt, where a 25 % difference shall be acceptable.	This term means that a nutritionally altered product contains at least 25 percent less of a nutrient or of calories than the regular, or reference, product. However, a reduced claim can't be made on a product if its reference food already meets the requirement for a "low" claim.

Table 15 Comparison between definition of Nutrition claims in Annex of EU Regulation 1924/2006 and FDA Nutrition Content Claims

ARE HEALTH CLAIMS UNDERSTOOD?

Nutrition claim	Criteria (cut-off points)
With no added sugar	Product does not contain any added mono- or disaccharides or any other food used for its sweetening properties. If sugars are naturally present in the food, the following indication should also appear on the label: "contains naturally occurring sugars".
Low sugar	No more than 5g of sugar per 100 g for solids or 2,5 g of sugar per 100 ml for liquids.
Low energy	Product does not contain more than 40 kcal (170 kJ)/100 g for solids or more than 20 kcal (80 kJ)/100 ml for liquids. For table-top sweeteners the limit of 4 kcal (17 kJ)/portion, with equivalent sweetening properties to 6 g of sucrose (approximately one teaspoon of sucrose), applies.
Energy-reduced	Energy value is reduced by at least 30 %, with an indication of the characteristic(s) which make(s) the food reduced in its total energy value.
Energy-free	Product does not contain more than 4 kcal (17 kJ)/100 ml. For table-top sweeteners the limit of 0,4 kcal (1,7 kJ)/portion, with equivalent sweetening properties to 6 g of sucrose (approximately one teaspoon of sucrose), applies.
Source of protein	At least 12 % of the energy value of the food is provided by protein.
High in protein	At least 20 % of the energy value of the food is provided by protein.
Source of (name of vitamin/s) and/or (name of mineral/s)	Product contains at least a significant amount as defined in the Annex to Directive 90/496/EEC or an amount provided for by derogations granted according to Article 7 of Regulation (EC) No 1925/2006 of the European Parliament and of the Council of 20 December 2006 on the addition of vitamins and minerals and of certain other substances to foods
Contains (name of the nutrient or other substance)	A claim that a food contains a nutrient or another substance, for which specific conditions are not laid down in this Regulation, or any claim likely to have the same meaning for the consumer, may only be made where the product complies with all the applicable provisions of this Regulation, and in particular Article 5. For vitamins and minerals the conditions of the claim "source of" shall apply.
Increased (name of the nutrient)	A claim stating that the content in one or more nutrients, other than vitamins and minerals, has been increased, and any claim likely to have the same meaning for the consumer, may only be made where the product meets the conditions for the claim "source of" and the increase in content is at least 30 % compared to a similar product.
Naturally/ Natural	Where a food naturally meets the condition(s) laid down in this Annex for the use of a nutritional claim, the term "naturally/ natural" may be used as a prefix to the claim.

Table 16 Nutrition Claims that are only defined in the Annex

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Content claim	Criteria
Serving Size	Nutrition Labeling and Education Act (NLEA) defines serving size as the amount of food customarily eaten at one time. Under the "bakery products" category, cookies have a reference amount of 30 g. The household measure closest to that amount is the number of cookies that comes closest to weighing 30 g. Thus, the serving size on the label of a package of cookies in which each cookie weighs 13 g would read "2 cookies (26 g)."
Free / no / zero	This term means that a product contains no amount of, or only trivial or "physiologically inconsequential" amounts of, one or more of these components: fat, saturated fat, cholesterol, sodium, sugars, and calories.
Low / little / few / low source of / contains a small amount of	This term can be used on foods that can be eaten frequently without exceeding dietary guidelines for one or more of these components: fat, saturated fat, cholesterol, sodium, and calories
Good source	This term means that one serving of a food contains 10 to 19 percent of the Daily Value for a particular nutrient.
Less / Fewer	This term means that a food, whether altered or not, contains 25 percent less of a nutrient or of calories than the reference food. For example, pretzels that have 25 percent less fat than potato chips could carry a "less" claim.
Low-calorie	40 calories or less per serving.
Calorie-free	fewer than 5 calories per serving
Low-cholesterol	20 mg or less and 2 g or less of saturated fat per serving
Cholesterol free	Less than 2 milligrams cholesterol and 2 grams or less saturated fat
More	This term means that a serving of food, whether altered or not, contains a nutrient that is at least 10 percent of the Daily Value more than the reference food. The 10 percent of Daily Value also applies to "fortified," "enriched" and "added" "extra and plus" claims, but in those cases, the food must be altered.
Light	Has at least ⅓ fewer calories or 50% less fat.* If more than half the calories are from fat, fat content must be reduced by 50% or more

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(....continued)

Compared to the reference/regular food	
Reduced calories	At least 25% fewer calories
Reduced sugar	At least 25% less sugar
Reduced sodium	At least 25% less sodium
Light in sodium	sodium content has been reduced by at least 50 percent.
Reduced fat	At least 25% less fat than the regular version
Reduced saturated fat	At least 25% less saturated fat* and reduced by more than 1 gram fat
Reduced cholesterol	At least 25% less cholesterol and 2 grams or less saturated fat
More or added fiber	At least 2.5 grams more*
Lean Claims. Fat content of meat, poultry, seafood, and game meats	
Lean	less than 10 g fat, 4.5 g or less saturated fat, and less than 95 mg cholesterol per serving and per 100 g.
extra lean	less than 5 g fat, less than 2 g saturated fat, and less than 95 mg cholesterol per serving and per 100 g

Table 17 FDA nutrition content claims definitions

Source: (Hunter & Cason, 2006)

Appendix C Claim types Worldwide

In this Appendix the different types of claims of other regions in the World are presented more detailed in the following order: the Codex Alimentarius (for international rules), Japan, Asia, Canada, Australia and New Zealand, and Africa

10.4 Codex Alimentarius

At an international level, nutrition labeling and health claims are controlled by the Codex Alimentarius. The Codex is a set of international standards, guidelines and related texts for food products. It is developed by the Codex Alimentarius Commission of the joint food standards program of the Food and Agricultural Organization (FAO) and the WHO. The aim of the Codex Alimentarius is to protect consumer health and encourage fair practice in international food trade. Although the implementation of the Codex Alimentarius is voluntary, the World Trade Organization has recognized it as a reference in international trade and trade disputes (Hawkes, 2004). Below the claims as defined by the Codex Alimentarius are described.

- Nutrition claim - Any representation which states, suggests or implies that a food has particular nutritional properties including but not limited to the energy value and to the content of protein, fat and carbohydrates, as well as the content of vitamins and minerals
 - Nutrient comparative claim - A claim that compares the nutrient levels and/or energy value of two or more foods
e.g.: "Reduced"
 - Nutrient content claim - A nutrition claim that describes the level of a nutrient contained in a food
e.g. "Source of calcium"; "High in fiber and low in fat"
- Health Claim - Any representation that states, suggests, or implies that a relationship exists between a food or a constituent of that food and health
 - Nutrient Function Claims - A nutrition claim that describes the physiological role of the nutrient in growth, development and normal functions of the body
e.g. "Nutrient A (naming a physiological role of nutrient A in the body in the maintenance of health and promotion of normal growth and development). Food X is a source of/ high in nutrient A"
 - Other Function Claims - These claims concern specific beneficial effects of the consumption of foods or their constituents, in the context of the total diet on normal functions or biological activities of the body. Such claims relate to a positive contri-

bution to health or to the improvement of a function or to modifying or preserving health

e.g. “Substance A (naming the effect of substance A on improving or modifying a physiological function or biological activity associated with health). Food Y contains x grams of substance A”

- Reduction of disease risk claims - Claims relating the consumption of a food or food constituent, in the context of the total diet, to the reduced risk of developing a disease or health-related condition. Risk reduction means significantly altering a major risk factor(s) for a disease or health-related condition. Diseases have multiple risk factors and altering one of these risk factors may or may not have a beneficial effect. The presentation of reduction of disease risk claims must ensure, for example, by use of appropriate language and reference to other risk factors, that consumers do not interpret them as prevention claims.

e.g. “A healthful diet low in nutrient or substance A may reduce the risk of disease D. Food X is low in nutrient or substance A”

10.5 Japan

1. Food with Health Claims (FHC)

FHC refer to foods that comply with the specifications and standards established by the Minister of Health, Labor and Welfare and are labeled with certain nutritional or health functions. These foods are categorized into two groups, according to differences in purpose and function:

a) Foods with Nutrient Function Claims (FNFC):

foods that are labeled with the functions of nutritional ingredients (vitamins and minerals)

b) Foods for Specified Health Uses (FOSHU):

foods officially approved to claim their physiological effects on the human body

2. Food for Special Dietary Uses (FOSDU)

FOSDU refer to foods that are approved/permited to display that the food is appropriate for specified dietary use.

There are five categories of FOSDU:

- (1) Formulas for pregnant or lactating women
- (2) Infant Formulas
- (3) Foods for the elderly with difficulty in masticating or swallowing
- (4) Medical foods for the ill

(5) Foods for Specified Health Uses (FOSHU)

3. Labeling system for Nutrient

Nutrition Labeling includes declaration of energy value and nutrients in accordance with the Nutrition Labeling Standards. The labeling is voluntary for all foods except foods with nutrition claims.

- List of Nutrients
- Nutrient Content Claims: "rich in", "low", "source of", enhanced, reduced

4. Prohibition of Misleading or Deceptive Labeling Claims (under Health Promotion Law)

Any claims of efficacy and function made on functional food must be relevant and based on scientific ground.

Foods for Specified Health Use (FOSHU)

FOSHU is the only type of food product (not ingredients) that can carry health claims and is composed of functional ingredients that affect the structure/function (physiological functions) of the body.

Requirements for FOSHU Approval

- Effectiveness on the human body is clearly proven
- Absence of any safety issues (animal toxicity tests, confirmation of effects in the cases of excess intake, etc.)
- Use of nutritionally appropriate ingredients (e.g. no excessive use of salt, etc.)
- Guarantee of compatibility with product specifications by the time of consumption
- Established quality control methods, such as specifications of products and ingredients, processes, and methods of analysis

In addition to "regular" FOSHU, following types of FOSHU are available.:

- Qualified FOSHU:
Food with health function which is not substantiated on scientific evidence that meets the level of FOSHU, or the food with certain effectiveness but without established mechanism of the effective element for the function will be approved as qualified FOSHU.
- Standardized FOSHU:
Standards and specifications are established for foods with sufficient FOSHU approvals and accumulation of scientific evidence. Standardized FOSHU are approved when it meets the standards and specifications.
- Reduction of disease risk FOSHU

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Reduction of disease risk claim is permitted when reduction of disease risk is clinically and nutritionally established in an ingredient.

For example: Calcium and Osteoporosis: "Intake of proper amount of calcium contained in healthy meals with appropriate exercise may support healthy bones of young women and reduce the risk of osteoporosis when aged."

(Ministry of Health, Labour and Welfare, n.d.)

Examples of FOSHU claims and ingredients:

- suitable for the people with mild hypertension
 - casein dodecanepptide
 - tochu leaf glycoside (geniposidic acid)
 - sardine peptide
 - Lacto-tripeptide
- helps lower the blood cholesterol level. (Soy protein)
- suitable for those who require iron supplementation due to their mild anaemic condition. (Heme Fe)
- It helps moderate the absorption of sugar. Thus it is suitable for people concerned with their blood-sugar level. (Indigestible dextrin)
- It increases intestinal bifidobacteria and thus helps maintain a good intestinal environment. (Oligosaccharides) (Uehara, 2001; p4)

10.6 Rest of Asia

China & Malaysia

- **Nutrient Content Statements** which highlight the presence or absence in the product of a specific nutrient.
- **Structure-Function Claims** which describe the physiological/biochemical impact of selected nutrients/bio-actives on the body's structure or function.
- **Health Claims** which describe a relationship between nutrients/bio-actives and reduced disease risk or enhanced health status

(AFIC, 2006)

China

Health claims are permitted on a special group of foods called "health foods." These are foods with special health functions for consumption by particular groups of people. Claims are not allowed for cancer, life prolongation, disease prevention/cure, or recovery of youthful vigour.

Malaysia

Health claims referring to disease are prohibited, but regulations introduced in 2002 now permit nutrient content and nutrient comparative and nutrient function claims. Eleven nutrient function claims are now permitted.

Honkong

There are no regulations on health claims except for the prohibition of disease prevention/cure claims, although there are regulations on health claims in advertisements. Draft regulations have, however, been developed for nutrient function claims following Codex guidelines.

Philippines

Health claims regulations are still being developed, but two disease risk reduction claims are permitted for calcium and reduced risk of osteoporosis, and dietary fat and reduced risk of cancer. Regulations also prohibit disease prevention/cure claims and claims for dietary properties that have not been proved to have a positive nutritional or health effect.

Singapore

Specific nutrition function claims are permitted on a case-by-case basis. Regulations prohibit disease prevention/cure claims and labels cannot include any claims that could be interpreted as advice of a medical nature. Health claims relating to specific conditions and diseases are currently under discussion, and are likely to be regulated within the next two years.

Korea

Health claims were permitted for the first time in 2003, but only for dietary supplements. Health claims on foods are still prohibited

(N.-S. Kwak, personal communication, June 2003 as cited by Hawkes, 2004)

10.7 Canada

Canada moved to a mandatory labeling system in January 2003, replacing a voluntary system (which had required labeling when a nutrition claim was made).

1. Nutrient content claims describe the level of a nutrient contained in food (i.e. "high in fiber", "low in salt", "source of omega-3 fatty acids", "free of trans fats") or are comparative (i.e. "reduced sodium" and "increased calcium"). They must be based on recognized scientific health criteria.
2. Nutrient function or biological role claims: The food product involved must contain five per cent of the Recommended Daily Intake of a vitamin or mineral, but no minimum levels for

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other nutrients are required for claims." For example: Calcium helps to build bones. Product X contains calcium.

3. **Health claims:** Health claim is not defined in Canadian Legislation, however, a distinction is made between therapeutic and risk reduction claims, which are currently prohibited, and structure, and function claims, which are allowed. An international working group of Health Canada (the Federal Department responsible for health policy) has identified 3 types of health claims:
 - **Structure/function claims** which describe the role of a nutrient or dietary ingredient intended to affect the structure or function in humans (United States definition). This includes claims about the biological role of a nutrient generally recognized as an aid or factor in maintaining the functions of the body, or necessary for the maintenance of good health and normal growth and development.
 - **Risk reduction claims** that a product significantly alters a major risk factor or factors recognized to be involved in the development of a chronic disease or abnormal physiological condition through product use.
 - **Therapeutic claims** that a product can cure, treat, mitigate or prevent a disease or condition.

All these claims may be "**Product**" (made for a single commercial product) and "**Generic**" claims (can be applied to any food).

- **Generic claims** can apply to any food product which meets certain criteria, such as the level of calcium needed for the calcium claim. For example, "A healthy diet low in saturated and trans fats may reduce the risk of heart disease. Product X is low in saturated and trans fats.
- **Product-specific claims:** These would apply to foods which are manufactured, sold or represented to have a direct, measurable effect on modifying, restoring or correcting an organic function or body structure in human beings beyond normal growth and development or maintenance of good health.
for example: Product Z helps to increase calcium absorption, and thereby to improved building of bones.

Health claim statements must

- be supported by acceptable scientific evidence
- be truthful and not misleading, consistent with the scope and nature of the scientific evidence

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- not conflict with national health and nutrition policies and guidelines
- not imply cure, treatment or prevention of diseases or adverse health conditions.

10.8 Australia New Zealand Food Standards Code

Food Standards Australia New Zealand (FSANZ) is now developing a new food standard which will allow the regulated use of health claims under two categories: general and high level

- General level claims (do not reference a biomarker or serious disease)
 - Content claims
 - Absolute content claim
'This food is high in calcium'; 'this food is low in fat'
 - Comparative content claim.
'Reduced fat'
 - General level health claims
 - Function Claim.
'This food is a source of calcium and when consumed as part of a healthy diet is good for strong bones and teeth'
 - Enhanced Function claim
'Exercise and a diet high in calcium and calcium containing foods like this product contributes to stronger bones'
 - Risk Reduction (refers to non-serious disease)
'This yoghurt contains acidophilus. Foods high in acidophilus as part of a healthy diet may reduce your risk of stomach upsets'
- High level claims (reference a biomarker or serious disease)
 - Biomarker maintenance claim.
'This food is high in Omega-6 fatty acids which may help to maintain normal blood cholesterol'
 - Biomarker enhancement claim.
'This food is high in Omega-6 fatty acids which may help to reduce blood cholesterol levels'
 - Risk reduction claim (ref a serious disease)
'This food is high in Omega-6 fatty acids, which as part of a diet low in saturated fat and high in soluble fiber may reduce the risk of developing heart disease'

10.9 African Region

- In Nigeria, nutrition labeling is required only on foods with special dietary uses and in South Africa, on foods for which a nutrition claim is made.
- In Mauritius, nutrition labeling was introduced by the Food Regulations of 1999 (made under the Food Act 1998). The regulations set out the specific nutrients that must be labeled for a series of selected nutrition claims. It also mandates the labeling of protein, fat, carbohydrate, vitamin and mineral content on infant foods, per 100g of the packaged food.
- Botswana and Kenya are in the process of developing nutrition labelings standards, drawing on the Codex Guidelines on Nutrition Labeling.

Appendix D Research Summary

Authors	Name of study	Country	Publishing date	Date of Survey	number of participants	Study mode of delivery	Results
Adams, L., Geuens, M.	Healthy or unhealthy slogans: That's the question	Belgium	2005		110	questionnaire	A healthy slogan only led to better responses in comparison to the unhealthy slogan if the product was also being perceived as healthy.
Asian Food Information Centre	Survey of Consumer Responses to Front-of-pack Nutrition and Health Information in China and Malaysia	China and Malaysia	2006	2006		focus groups	Health claims were found to be more helpful in to understand the disease health association than a nutrition content claim. The response to health claims communicating potential reduction of disease risk was perceived as appealing to respondents who had particular health objectives. Structure-function claims resonated positively with the respondents - the link between the nutrients and health benefits were perceived to be helpful in furthering respondent understanding of the functional benefits of the foods
Bech-Larsen, T., & Grunert, K.	The perceived healthiness of functional foods. A copint study of Danish, Finnish and American consumers' perception of functional foods	United States, Denmark, Finland	2003	2002	500	interview	Health claims have a positive influence on consumers' perception of healthiness of foods. Denmark and Finland prevention claim (RRD) marginally higher than physiological (FC), USA much higher.
Byrd-Beddenfer, C., Wong, A., Cottee, P.	Consumer understanding of US and EU nutrition Labels	United Kingdom	2000		50	face to face interview	The term "free" is universally understood except in the case where the EU label listed the nutrient as "trace". It appears that some consumers do not understand the meaning of "trace". The term "high" is not universally understood
Canire, M., & Dougherty, M.	Internet Survey of Nutrition Claim Knowledge	United States	2005	2001	136	Internet survey	The three approved and three unapproved health claims were correctly identified by most survey respondents. Structure-function and unapproved claims were more confusing.
Chan, C., Patch, C., Williams, P.	Australian consumers are sceptical about but influenced by claims about fat on food labels	Australia	2005		36	focus group discussions	Participants didn't understand the cutoff points in the claims, example participants regarded 'Fat Free' as often being a false claim, because of small amount of fat declared in the nutrition information panel.
Croft, J., Harris, F., & Hayward, W. for FSA	Health claims on food packaging consumer-related qualitative research	United Kingdom	2002		130	6 qualitative half test days interviews	Consumers do make a distinction between the types of claim, but not based on understanding of the underlying scientific basis for the grouping of claims. Instead, they drew on a variety of perceptions, assumptions and prejudices to make their own sense of what was being offered
Derby, B., & Levy, A.	Effects of Strength of Science Disclaimers on the Communication Impacts of Health Claims	United States	2005		1,920	mail intercept	Text sentences using adjectives do not correctly convey to respondents the intended strength of science. The schemes using report card grades did convey the intended strength of science. Respondents' perceptions of product health benefits were not diminished by conveying greater scientific uncertainty for a claim. In some cases conveying more scientific certainty for a claim actually led to more negative perceptions of product health benefits. Health benefits were perceived stronger in a health claim than in a nutrient content claim.
Feunekes, G., Gortemaker, I., Willems, A., Lion, R., & Kommer, van den, M.	Front-of-pack nutrition labelling: Testing effectiveness of different nutrition labelling formats front-of-pack in four European countries	United Kingdom, Germany	2008		1630	Internet panels	Participants needed significantly less time to evaluate 'simple' compared to 'complex' schemes. Simpler front-of-pack labelling formats seem more appropriate in a shopping environment where quick decisions are made.
Food Standards Australia New Zealand 2003a	Qualitative consumer study on nutrient content claims	Australia and New Zealand	2003	2002		focus groups	Consumers are confused about the meaning behind the various words and terms used in content claims such as 'high', 'low', 'reduced', 'source of', 'light'

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Authors	Name of study	Country	Publishing date	Date of Survey	number of participants	Study mode of delivery	Results
Food Standards Australia New Zealand 2003b	Quantitative research with consumers	Australia and New Zealand	2003	2002	1940	door-to-door interviews	Consumers found it difficult to interpret most claims. More consumers understood a nutrition claim than a health claim
Food Standards Australia New Zealand 2005a	Qualitative research on participants' perceptions and use of nutrition, health and related claims on packaged foods and associated advertising material	Australia and New Zealand	2005		69	69 individual in-depth interviews.	Existing knowledge about specific nutrients led to potential health benefits being better understood in content claims. A calcium content claim was recognized by participants as being a claim about content rather than health, but many participants nonetheless understood calcium was good for bones, while almost no health benefit was understood from the omega-6 fatty acids content claim because much less was known about it
Food Standards Australia New Zealand 2005b	Quantitative research on consumers' perceptions and use of nutrition, health and related claims on packaged foods.	Australia and New Zealand	2005	2005	1044	online survey	Health claims communicate greater health benefits compared to a nutrition claims.
Food Standards Australia New Zealand-TNS	Consumer research on no added sugar claims	Australia and New Zealand	2006		993	online survey	the disclaimer had a positive, but small effect, on the interpretation of the no added sugar claim. With the disclaimer there was a high level of recognition that products with a claim of no added sugar did in fact contain some sugar
Grunert, K.	Health claims and consumer behaviour	Denmark, Finland, Iceland, Norway, Sweden	n/a	2007		webbased instrument	'Negative halo effect'. Some consumers like full information, others only relevant information.
Gyselaers, V.	De impact van gezondheidsbeweringen op het consumentengegedrag ten aanzien van functionele voeding	Belgie	2006		343	gestructureerde gesprekken en directe vragenlijst	No statistically significant difference for gender, education, residence or age of the respondent for knowledge of functional ingredients. More people with a higher education know functional foods. More people who know functional foods think they are beneficial for the health than people who are not acquainted with functional foods.
Hocker, N., & Terlanawat, R	Dissecting Qualified Health Claims: Evidence From Experimental Studies	United States	2008	2005	pretest 102 + study1 186 + study2 109		Only level D can be differentiated from other levels. With a report card, respondents rated level 'A' statistically and significantly higher than level 'D', without the report card the difference was not statistically significant.
Jenkins, R. for CCFN	Tracking Nutrition Trends V	Canada	2006		2014	telephone survey	Health claims and a healthy, better choice slogan, symbol or logo are read by slightly less than half of the population
Kapsak, W., Schmidt, D., Childs, N., Meunier, J., & White, C.	Consumer perceptions of graded, graphic and text label presentations for qualified health claims	United States	2008	January 2004	5,642	focus groups + web-survey	Consumers had difficulty sorting out the strength of scientific evidence associated with four distinct claim levels. Consumers can better distinguish among the four levels of scientific evidence when presented with the FDA-graphic than with the text only claim. Consumers do not perceive a difference among unqualified text health claims and structure-function claims with respect to the scientific evidence
Lanumata, T., Hata, C., Signal, L.N., and Hareidku, R.	Front of Pack Labeling from the Perspectives of Maori, Pacific and Low-income New Zealanders	New Zealand	2008		121	Six focus groups	Maori, Pacific and low-income New Zealanders rarely use nutrition labels despite their significantly higher risk of nutrition related disease than the risk of New Zealand Europeans. Front of pack labeling would assist them to purchase healthy food. These communities recommended a nutrition label that is simple, colourful and easy to understand.

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Authors	Name of study	Country	Publishing date	Date of Survey	number of participants	Study mode of delivery	Results
Lin, J.	Experimental study of health claims on food packages	United States	2007	2006	1077	Internal consumer panel	Respondents are more likely to recognize the nutrient if it is mentioned in a health claim that mentions the substance than if it is not mentioned.
Murphy, R.	Consumer perceptions of qualified health claims in advertising	United States	2005	1998-2003	480	shopping mall copy test	Consumers do notice and take into account disclaimers concerning the degree of scientific support behind a claim. It is not necessary to use very strongly worded disclaimers to affect consumer perceptions of scientific certainty.
Murphy, R., Ippolito, P. M. and Pappalardo, J.	Consumer Perceptions of Heart-Health Claims for Cooking Oils and Vegetable Oil Spreads	United States	2007		1200	copy test research	For the questions that dealt with the caloric content of the tested products, the average responses of consumers assigned to the heart-health claim did not differ statistically from the responses of consumers who saw only nutrient content claims. Respondents in the health claim conditions did not believe that simply consuming the products (adding the oil to a diet because it helps reduce the risk of heart disease instead of substituting normal oil for a lower caloric version) would lower the risk of heart disease.
Siegrist, M., Stampfli, N., Kastenholz, H.	Consumers' willingness to buy functional foods: The influence of carrier, benefit and trust	Switzerland	2008		249	Mail survey	Health claims are best appreciated when attached to a carrier that has a positive 'health image' and health claim history instead of an 'unhealthy' carrier.
Signal, L., Lanumala, T., Robinson, J., Tavila, A.	Perceptions of New Zealand nutrition labels by Maori, Pacific and low-income shoppers	New Zealand	2007		158	focus groups	Many participants stated they could not afford products with the Tick because the Tick does not often appear on low-cost brands.
Singer, L., Williams, P. G., Rigdes, L., Murray, S.	Consumer reactions to different health claim formats on food labels	Australia and New Zealand	2006		149	Shopping mall intercept method, Interview	Most understood nutrition claim well. 5% if participants incorrectly interpreted the health claim as a nutrient content claim about vitamin D.
Stockley, L., Kaur, A., & Rayner, M.	Summary of original research from December 2006 - June 2003 on consumer preferences and use of Front of Pack nutrition schemes	9 countries, cited study: Norway	2008			web survey, focus group	The health logo was perceived as quick and simple to use, but giving less information than traffic lights
Svedberg, E.	Consumers' views regarding health claims on food packages.	Sweden	2002	1999	30	individual semi-structured interviews	All the participants in the present study shared the opinion that it is generally difficult to understand many concepts and expressions used on food packages
Teratanavatt, R., Hooker, N., Haugtvedt, C., & Rucker, D.	Consumer understanding and use of health information on product labels: marketing implications for functional food	United States	2004		372		No statistically significant difference among claim levels when using measures of evaluation of strength of scientific studies, confidence about claim information, and perception of product's health benefit. Increasing then n attitude from D to A.
Tenues, M., McMahon, K., Lapsley, K., & Johnson, G.	Qualified Claim for Nuts and Heart Disease Prevention: Development of Consumer-Friendly Language	United States	2006	2003	408	interviews	It is possible to meet FDA's standards for truthful and not misleading health claims using consumer-friendly language
Van Kleef, E., Van Trijp, H., & Luning, P.	Functional foods, health claim-food product compatibility and the impact of health claim framing on consumer evaluation	Netherlands	2005	2002	50 + 124	convenience sample	Health claims are best appreciated when attached to a carrier (the product type that is used in combination with the claim) that has a positive 'health image' and health claim history.

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Authors	Name of study	Country	Publishing date	Date of Survey	number of participants	Study mode of delivery	Results
Van Trijp, H., & Van der Lans, I.	Consumer perceptions of nutrition	United Kingdom, Germany, Italy and United States	2007		1560 UK; 1621 US; 1620 Germany; 1566 Italy	Internet panel	Claim type does not affect the perception of healthiness and had only a small effect on difficulty to understand. A health claim not mentioning any ingredient is more easily understood than a content claim (most difficult to understand), but this depended also on which benefit was addressed. For cardiovascular disease and infections, the nutrient content claim is most difficult to understand for consumers and the health claim the least difficult. For weight and concentration the content claim is the least difficult to understand
Vandercammen, M.	Gezondheidsclaims	Belgium	2003		250		Consumers cannot distinguish between nutrition and health claims
Vandercammen, M. for OIVO	Consumentenpercepties met betrekking tot de voedingswaarde-etikettering	Belgium	2005	2004	486	quantitative: interviews; 2 qualitative; 2 discussion groups, (french +dutch)	Participants found the terminology difficult. Some found that they were obliged to use product with nutrition claim to enhance their health.
Warsink, B., & Chandon, P.	The Biasing Health Halos of Fast-Food Restaurant Health Claims:	United States	2007		632	study 1: survey at diners; study 2,3,4: between-subjects design.	Inferred bias , and halo effect: consumers believe that foods low in cholesterol are also low in fat. That adding a "heart-healthy" sign on a menu reduced the perceived risk of heart disease when objective nutritional information was absent, even though it was placed next to an objectively unhealthy menu item. Consumers estimate that familiar sandwiches and burgers contain up to 35% fewer calories when they come from restaurants claiming to be healthy , than when they come from restaurants not making this claim
Williams, P., McMahon, A., & Boustead, R.	A case study of sodium reduction in breakfast cereals and the impact of the Tick food information program in Australia	New Zealand	2003				More salt was reduced than needed to meet the requirements of the Tick program itself
Young, L., & Swinburn, B.	Impact of the Pick the Tick food information programme on the salt content of food in New Zealand	Australia	2002				The Pick the Tick influenced food companies to reduce 33 tons of salt in products.

Figure 31 Research used in this report

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